

ROADS *and* STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

Gillette Publishing Co., 22 West Maple St., Chicago 10, Illinois • Accepted as Controlled Circulation Publication at Milwaukee, Wis.



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July 1958



HUGHES-KEENAN EXECUTIVES (left to right) Wesley Hartley, Service Supervisor; Harry A. Humes, Secretary-Treasurer; Kenneth F. Hubbard, Purchasing Agent check specifications of the "Roustabout" Model VH-10, 5-ton hydraulic motive crane (background) powered by Chrysler Ind. 30 Engine which also powers 3, 4 and 6-ton models. 10 and 12½ ton models are powered by Chrysler Ind. 32 Engines.

why Hughes-Keenan Powers with Chrysler Industrial Engines

The "Roustabout" is a highly maneuverable motive crane especially designed for tough work in close quarters—industrial plants and yards, railroad yards, scrap yards. At the heart of this versatile crane is a Chrysler Industrial Engine—selected by Hughes-Keenan because it stands up under the rugged work demands better than any competitive engine—with far less maintenance. It is economical to operate—whether moving from job to job at 15 m.p.h. or idling in the yard for long periods. Equally important, Chrysler's great service and parts network assures Hughes-Keenan customers minimum losses from down time.

ROUSTABOUT has an extremely short turning radius and a rotating boom; all operations can be performed simultaneously or independently. Powered by Chrysler Ind. 30 Engine, available with Torque Converter.



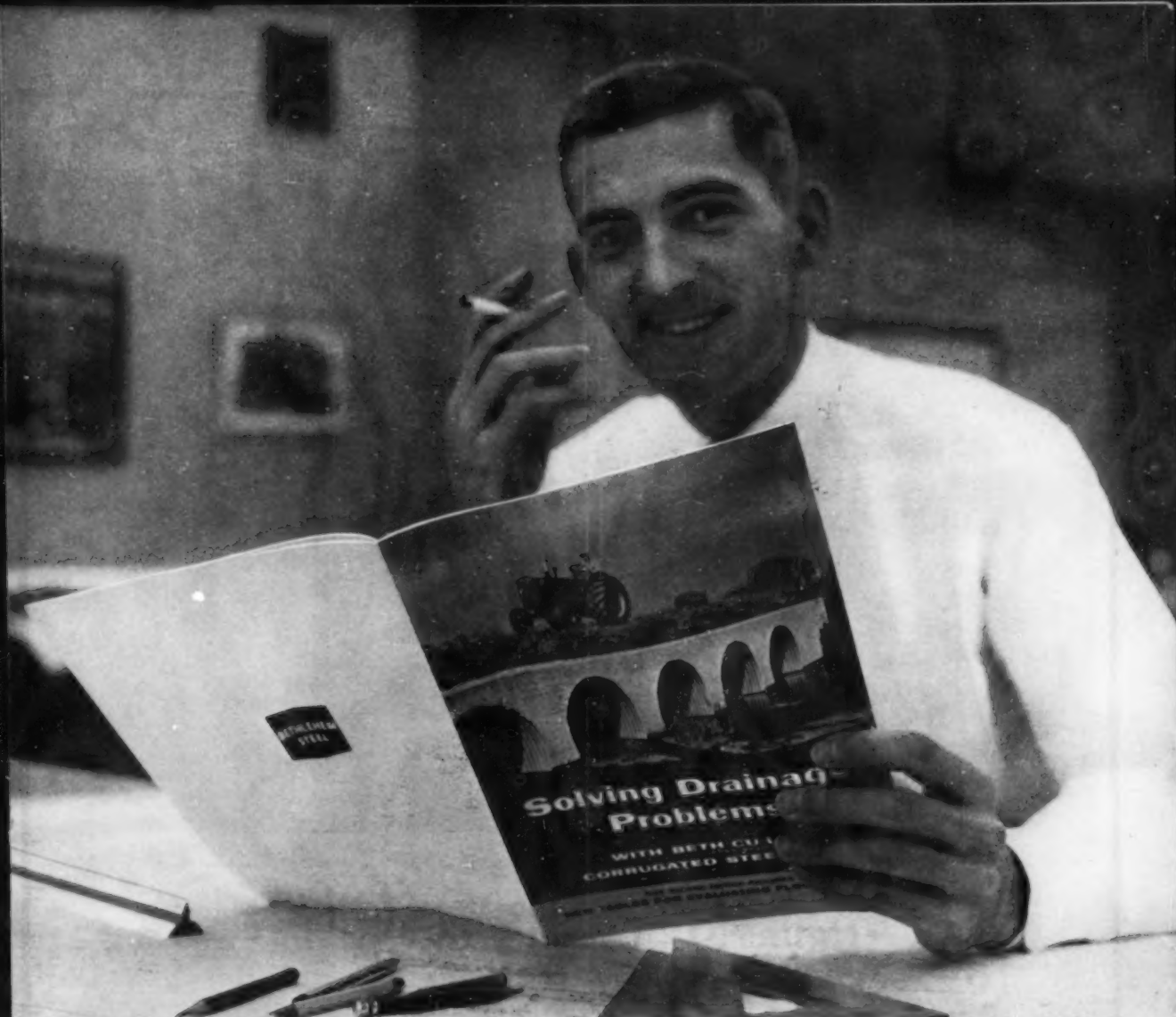
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Halbert P. Gillette, 1869-1958

Halbert P. Gillette, founder and president of Gillette Publishing Company of Chicago, publisher of road and construction magazines, died June 18 at his home in San Marino, California. He was 88. Mr. Gillette was the active policy head of his company up to his death, having, however, relinquished the management details to younger hands.

Mr. Gillette's 56-year career in publishing followed graduation in 1892 as a mining engineer from Columbia University and experience in civil engineering and contracting. In 1902 he joined the staff of *Engineering News*, one of the predecessor publications of *Engineering News-Record*. His earliest recognition came through the pioneer publishing of two books on construction cost data and a small treatise on road construction.

The business which later became Gillette Publishing Company was founded in 1906. One of the early successes was the *Handbook of Construction Cost Data*, which ran through many editions and sold world-wide. Periodicals were published under

various titles, possibly the best known for many years being *Engineering and Contracting*.

Mr. Gillette, who was long known for his forthright editorials, also found time to branch out from publishing into a consulting practice on public utility valuation and rate making. Other work included highly original studies in the broader field of economics. His more recent writings have included the results of personal studies of annual tree ring growths and long-time climate cycles and related astronomical and physical laws. He was engaged in this study at the time of his death. He was a member of the American Society of Civil Engineers for many years.

Surviving Mr. Gillette is his widow, Winnie E. Gillette, a son, Edward Scranton Gillette, who heads Scranton Publishing Company; a daughter, Mrs. F. H. G. Forsythe; and his grandson, Halbert Scranton Gillette, who is vice president and assistant publisher heading the Gillette Publishing Company's operations in Chicago. He also leaves four granddaughters and nine great-grandchildren.

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COUNTLESS TONS. Its \$400,000,000 price tag attests the scope of this job—which runs nearly 1/5 the way around the world! Up to their ears in countless tons of muck, muskeg, rock, shale and dirt, the contractors are coming up with a minimum of 22-foot pavement on 5- to 10-foot shoulders—and only 271 miles of "impassable" gaps still to go! Shown here is an all-mountain sector in British Columbia which previously boasted no roads at all. From coast to coast, Trans-Canada's hard-won miles have felt the sure imprint of Goodyear 3-T Nylon Cord off-the-road tires.



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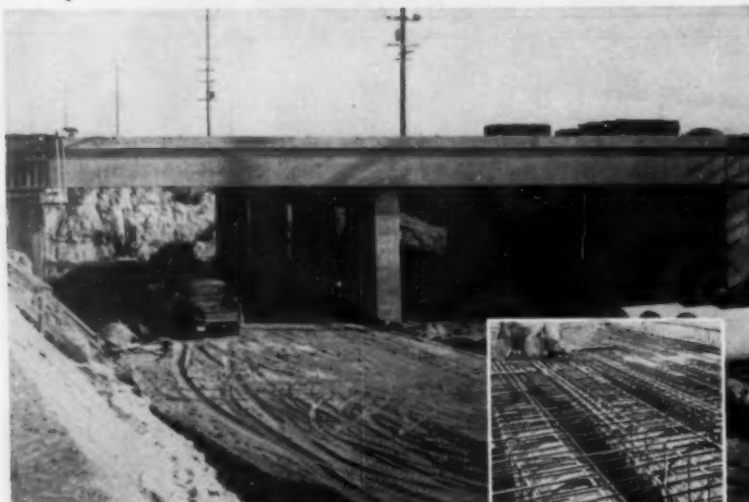
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Santa Fe Railroad Bridge, Los Angeles, Cal.
George S. Iwanaga and Murray Brill, L.A.
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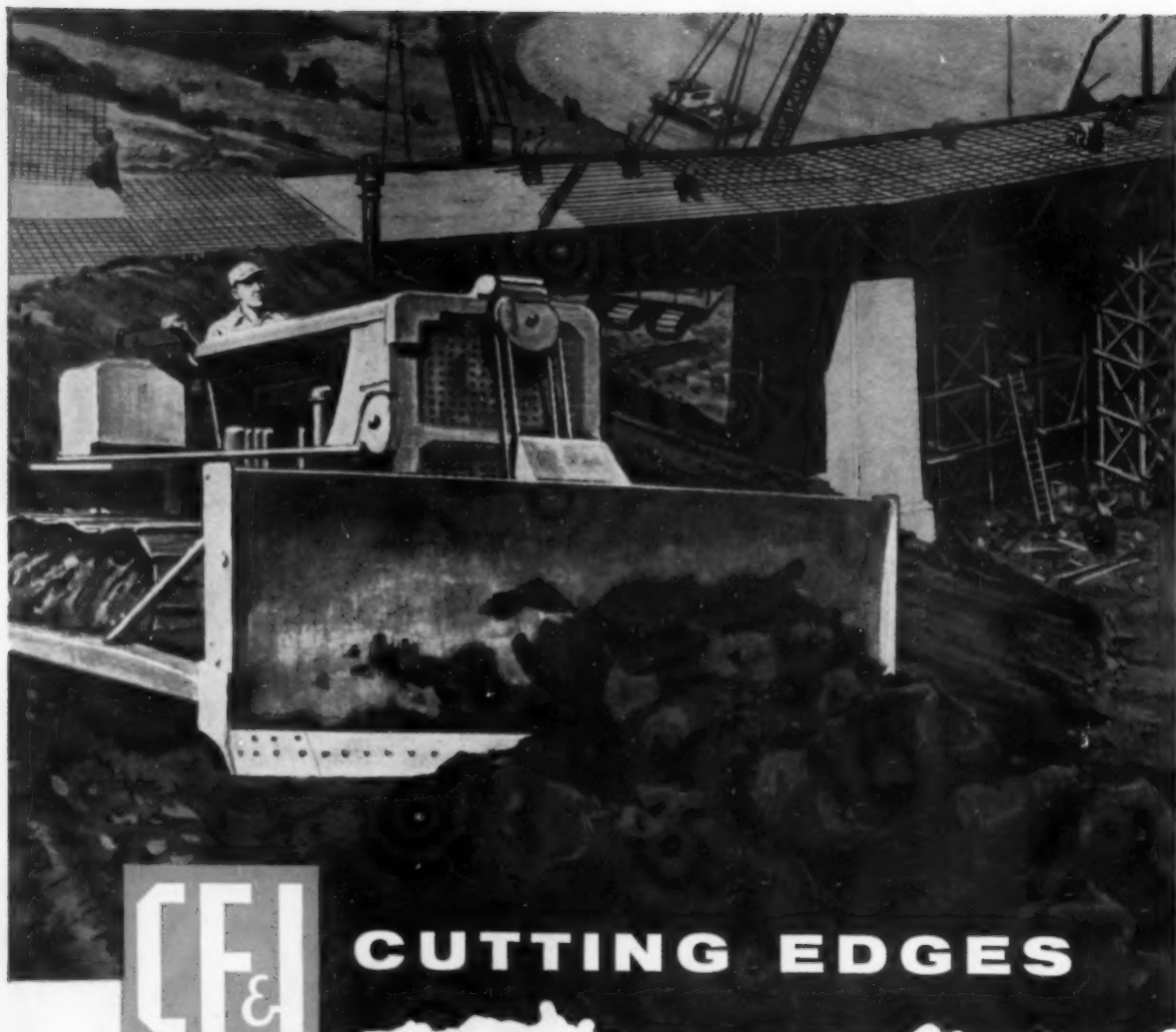
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CUT DOWNTIME

On earthmoving projects there is nothing more costly than lost time due to idle or poor equipment. Blade or cutting edge failures often result in work stoppage and higher costs, especially when replacement parts are not readily available.

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ROADS AND STREETS, July, 1958

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**“This truck
has run over
7500 hours—and we’ve**





◀ **OPEN PIT MINING SPECIALISTS**, the Isbell firm relies exclusively on Texaco lubricants to keep 17 large dump trucks, 4 shovels, 2 'dozers and 2 rotary drills on the job.

TEXACO LUBRICATION ENGINEER R. H. Trimmer reviews lube problems with Supt. G. L. Laughton who credits Texaco Simplified Lubrication Plan with cutting maintenance costs and keeping big mining job on schedule.



never removed the pan”

“The Texaco Simplified Lubrication Plan keeps maintenance costs down, keeps the job on schedule,” reports George L. Laughton, Supt. of Isbell Construction Company’s Three Kids Mine project.

Isbell Construction Company is doing strip mining on contract with Manganese, Inc., Henderson, Nevada. They are using a Texaco Simplified Lubrication Plan for this project, and it is piling up some outstanding records.

“As of January 17, the truck shown in the picture had operated 7,714 hours using *Texaco Ursa Heavy Duty SAE 40* exclusively, and it’s never had the pan removed,” reports Superintendent George L. Laughton. “We also use *Texaco Crater 2X Fluid* for wire rope, *Texaco Gear Lube HD* for transmissions, *Texaco Marfak* and *Texaco Marfak Heavy Duty*, for chassis and wheel bearings. We are entirely satisfied with Texaco lubricants,” says Mr. Laughton, “and we have never had a failure due to lubrication.”

For your equipment, Isbell’s outstanding success with Texaco lubricants proves two things: the quality of Texaco lubricants, and the advisability of getting Texaco to work out your Simplified Lubrication Plan. Because it is tailored specifically to each job’s special needs, a Texaco Simplified Lubrication Plan enables you to

handle all major lubrication with very few lubricants — as few as 6 in many cases. That keeps lubricant inventories low, and cuts down your chances of making lubrication mistakes. It also trims your maintenance expense. Above all, your equipment runs smoothly so your jobs can keep on schedule.

Ask a Texaco Lubrication Engineer to help you simplify your lubrication procedure with a Texaco Simplified Lubrication Plan. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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ROADS AND STREETS

A GILLETTE PUBLICATION

JULY, 1958

VOLUME 101

NUMBER 7

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Road Jobs Move Faster with Bucyrus-Erie Cranes ... Yours Can, Too!

With Bucyrus-Erie cranes handling key jobs like those shown here, road jobs move along faster, mean bigger profits for contractors. Look over the jobs pictured . . . you'll see how important features helped these Bucyrus-Erie crane users handle tough jobs quickly and effectively.

You'll see why Bucyrus-Erie cranes are favorites of owners, operators, and maintenance men on road jobs wherever you go. And, most important, you'll see why you'll be ahead on your road jobs with Bucyrus-Erie cranes. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

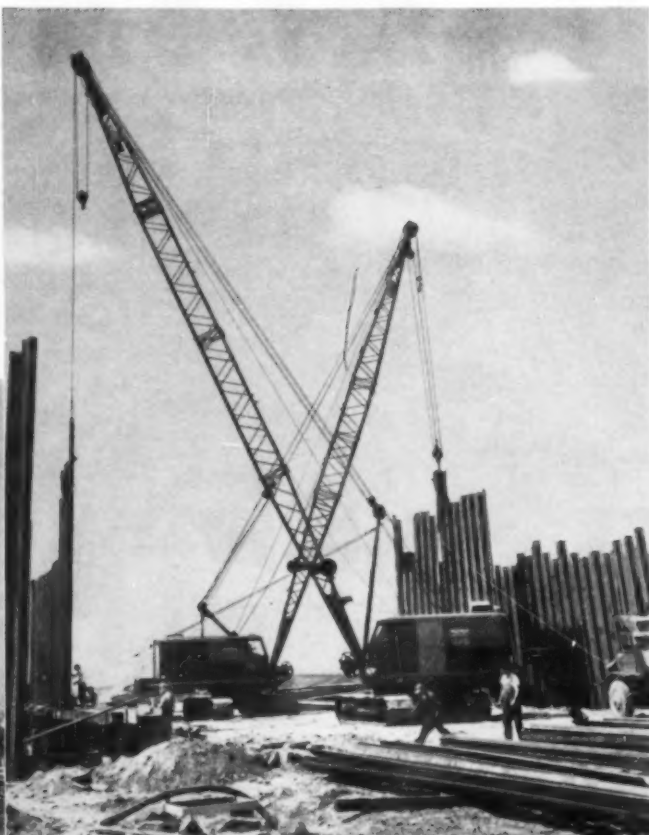
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**BUCYRUS
ERIE**

A Familiar Sign at Scenes of Progress



Equipped with clamshell bucket, this 38-B crane moves earth in construction of approaches to the Indiana Turnpike near Hammond. The load-lift cycle is smooth, balanced, and coordinated to prevent overstressing of parts and excessive wear.



A 51-B and 54-B team up to drive pile on a section of the New Jersey Turnpike near New York City. A variety of boom lengths and jib extensions enables these machines to meet various job requirements.

A 54-B crane installs one section of a bridge lift system near Miami, Fla. Independent power controlled lowering boom hoist, standard on the 54-B, enables the operator to change boom angle at any point in the cycle—permits accurate placement of loads.

This 38-B crane with "headache ball" breaks up rock on the Massachusetts Turnpike near Blanford. The boom on this crane is of lattice-type construction for strength and light weight. Angle members are welded to the inside of chord legs so there are no obstructions on the outside of booms.

Reaching 160 feet, an 88-B crane erects steel for a highway bridge in southern California. The smooth, soft air controls permit easy, precise operation while retaining the feel of control for the operator. Also at work on the project are Bucyrus-Erie 22-B and 38-B cranes.



International® Fleet

S. J. Groves & Sons



The Groves' pattern for high-speed earthmoving: two heaped "75" Payscraper units streaking toward the fill; two more loading fast in the cut with TD-24 full-power push-loading assistance, and another pair coming into the cut for quick pick-ups.

D. H. Groves, vice president and project manager, is double-shifting earthmoving operations, shooting for contract completion before Labor Day.

International®

International Harvester Co.,
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Construction Equipment

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Making Dirt Fly for on Wisconsin #94



Along 40 miles of Wisconsin Interstate Highway #94 between Menomonie and Hudson, high-speed earthmovers are making the grade for what will ultimately be part of the Chicago-Twin Cities freeway.

In St. Croix County, S. J. Groves & Sons Co., Minneapolis, is highballing a 2.92-mile stretch on a \$416,000 prime contract for grading, drainage, and sub-base with more than 70% International equipment. Groves' "75" Payscraper fleet, push-loaded by TD-24 Torque Converter crawlers, is moving 605,000 cu yd of unclassified excavation and 115,000 cu yd of borrow on 1,900-ft average hauls.

Twenty-cu-yd loads of Wisconsin clay are packed into "75" Payscraper bowls by TD-24 pushers that shorten the loading cycle from contact to kick-out. The TD-24 foot-operated engine decelerator makes "feather-touch" pusher contact possible. Exclusive TD-24 Planetary Hi-Lo range power-shifting supplies full power in the cut and

speeds scraper kick-outs a gear higher in many cases. And TD-24 pushers save additional cycle time by using exclusive Planet Power steering for faster repositioning and scraper pick-ups.

Payscraper power gets the rigs in and out of cuts fast, provides travel speeds up to 24 mph that rolls paydirt to fills in shorter cycle times. High power-to-weight ratio, load-heaping bowl design, exclusive Hydro-Steer—all help give the Payscraper production-boosting operating ease and safety.

Prove to yourself that an all-International matched scraper-crawler fleet is your best bet to back up your low bids. See how International Payscraper units help get the job done faster at less cost. See how International TD-24 Planet Power steering gives you pusher performance unmatched on your pans. See your International Construction Equipment Distributor for an on-the-job demonstration!

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ROADS AND STREETS, July, 1958

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Big, heavy-duty . . . with plenty of load-stability on or off-pavement . . . new Koehring® 435 truck crane safely lifts up to 35 tons, with 40-foot boom at 15-foot radius (based on 85% rating). Removable counterweight, boom, outriggers reduce weight well within highway load-limits.

Now, meet the new 3-axle 305 Cruiser (below) . . . one-man operated, self-powered, 25-ton crane, with travel speeds up to 18 mph . . . smooth torque-converter drive . . . automotive type power-steering . . . short 27 ft.-9¼ in. turning radius . . . 28% gradability. Boom lengths: 30 to 100 feet, plus 15 to 30 feet of jib!

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	305	3-axle truck, or 18 mph Cruiser	38,000 lbs.	at 13-ft. radius
	435	4-axle truck	70,000 lbs.	at 15-ft. radius
	545	4-axle truck	90,000 lbs.	at 15-ft. radius
ON CRAWLERS		Size shovel	CRANE LIFT CAPACITIES (Crawler ratings based on 75% of tipping load.)	
	205	½ Cu. Yd.	20,000 lbs.	at 10-ft. radius
	305	¾ Cu. Yd.	30,000 lbs.	at 12-ft. radius
	405	1 Cu. Yd.	40,000 lbs.	at 12-ft. radius
	545	(Crane only—85% rating)	90,000 lbs.	at 12-ft. radius
	605	1½ Cu. Yds.	72,300 lbs.	at 12-ft. radius
	805	2 Cu. Yds.	104,300 lbs.	at 12-ft. radius
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WITH ALL ATTACHMENTS**

25-TON 305 CRUISER® CRANE



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15-TON

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One man controls all operations . . . one engine supplies all power for work-and-travel on Koehring 205 Cruiser (below). It drives job-to-job at 21.5 mph (highway travel unrestricted). There's torque-converter on 4-wheel drive, automotive power-steering, 27 1/2-foot turn radius, 30% gradability. Koehring 205 Cruiser has all standard attachments: clamshell, dragline, shovel, hoe.

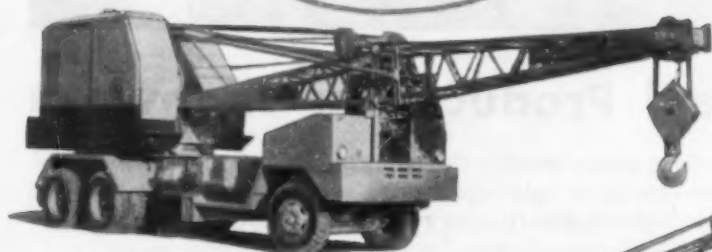
15-TON

205 CRUISER CRANE



25-TON

305 TRUCK CRANE



Here's another heavy-duty, high-reach crane worth looking into . . . a truck-mounted 305, that raises up to 100 feet of main boom (or 130-foot boom-and-jib) with low A-frame! It's a 25-ton capacity crane with clamshell, dragline, shovel, hoe versatility.



45-TON

545 TRUCK CRANE

With this big, truck-mounted 545, Koehring now brings you 45 tons of lift capacity . . . plus quick conversion from fully-equipped machine to roadable machine.

K029

Pick the size that suits YOU . . . then call Koehring distributor today for a demonstration.

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ROADS AND STREETS, July, 1959



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PAYHAULER FLEET whips 17% grade with bonus loads

The Caldwell Engineers' five-unit 65 Payhauler® fleet highballs 2,500 cu yd of shot rock 1,000 feet daily up a haul road with 17% average grade. That's how this sub-contractor keeps on schedule! His contract calls for excavating and crushing 165,000 tons of rock on the \$13,000,000 hydro and flood control Oliver Dam under construction at Columbus, Ga.

Making the 17% grade with bonus loads is routine for the Payhauler fleet on this newest of all dams being built by the Georgia Power Co. at Columbus.

"These are crooked haul roads," reports excavation foreman Dudley Rabb, "but our Payhauler fleet is whipping them to keep us on schedule. The rigs haul through axle-deep water 50% of the time...make pull-outs up roads that rise 170 feet in 1,000 feet...yet speed bonus loads to crusher and stockpile."

Prove the get-away surge, and up to 25% faster haul speed of an International Payhauler—the result of bonus turbo-charged diesel power; road-matched and load-matched gear choice; and the power-cushioning leverage of planetary drive axles.

See how a Payhauler shortens the cycle with pick-up truck spotting ease. Discover how exclusive high reverse, zip-around power steering, and grade-beating power boost your profits. Try split-second dumping with the double-acting hydraulic hoist. Measure the advantage of Payhauler operating ease, and downgrade safety of positive Torqmatic braking! See your International Equipment Distributor for a demonstration!



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A smart
hunter knows
this sign
means deer...

A smart
bearing
buyer knows
this sign
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"Timken" is a trade-mark, not just a type of product. If you're looking for the best, look for the trade-mark "Timken". It's your assurance of getting the highest value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



TAPERED ROLLER BEARINGS • REMOVABLE ROCK BITS • FINE ALLOY STEEL
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ROADS AND STREETS

Sixty-Six Years of Editorial Leadership

Washington News Letter



Exclusive - By Duane L. Cronk, Director, Highway Information Services

July 10, 1958

Contracting procedures of state highway departments was a top subject in Washington last month where one organization has launched a survey of bidding practices and another has completed such a poll. The American Road Builders Association is asking its contractor members to document delays arising from present contract procedures. The Bureau of Public Roads has announced results of its survey of other contract awarding practices.

ARBA is concerned about the inefficiency and ineconomy inherent in certain time-consuming awarding procedures. Among other things, it wants contractors to put the finger on stages where problems occur most frequently. The comprehensive four-page questionnaire lists such questions as:

- How much advance notice do you usually get of proposed future work?
- Does the qualification procedure under which you operate produce a realistic appraisal of the amount of highway construction you can undertake at one time?
- Has your experience with lump-sum contracts been favorable?
- What are some of the delays you have recently experienced?

Results of the poll will be forwarded to Congressional committees concerned with progress of the National Highway Program, to AASHO and BPR.

* * *

Meanwhile, the BPR has found from its survey of state highway departments that most states do not permit bidders to condition acceptance of proposals upon the award of more than one contract, but will permit contractors to withdraw unopened proposals before a project reading after having been read low earlier on other projects and that about one-fourth of the states permit bidders the option of bidding on several projects and limiting the overall value of work they will accept at one letting. Other findings were:

- Although all states permit subcontracting and equipment rental, some do not recognize "subs" as such. About 15-25% of the total volume of contract work is accomplished by subcontract or by utilizing rented equipment. Subcontracts may accumulate up to 50% of the contract amount. The national average is about \$50,000.

- There has been a 20% increase in the number of qualified contractors entering the highway field. All states reported increases (some as high as 50%).

(continued on next page)

• States are continuing to vary the sizes of highway projects in their lettings to exploit the full working potential of all firms in its contractor pool.

A reading of current highway construction has been taken by the Associated General Contractors of America. By polling its 125 local chapters, AGC found that although only about 50% of the respondents believe roadbuilding is above normal now, 72% anticipate that the 1958 total will be higher than usual. When queried on the progress of the National Highway Program, however, 40% believe (confirming the confusion over industry statistics) the program is behind schedule, 39% about on schedule, and 21% ahead of schedule. Other interesting figures: 60% of the chapter managers said the recession in their area has levelled off, 34% said it has lessened. Contractor competition has increased in 69 areas, remained about the same in 26.

* * *

Truckers have been quietly collecting data to prove that they pay their way when it comes to highway financing. Two years ago the American Trucking Associations here in Washington developed a system for comparing highway user taxes, generated on selected segments of roads, and the annual cost of maintaining those stretches. Thus far, studies have been completed on 40 sections in 22 states, and others are still under way.

Here's an example: A 12.9-mile section of Route 31W between Upton Monfordsville, Kentucky, is two-lane rural flexible pavement. It "earns" \$340,140 annually, of which trucks pay 59.3%, or \$201,889. The total cost of the segment, including maintenance and amortization of the original investment is only \$44,517. Thus, the truckers conclude, annual earnings are 764% of annual costs.

* * *

Congress is considering an amendment to the Highway Act which would permit state highway departments to purchase right-of-way seven years in advance of construction, instead of the current five years. Federal-aid would be advanced for this purpose. California is most concerned because it has been buying land well in advance of construction for several years. On one project, California officials testified, an original outlay of \$25 million for right-of-way before developers had a chance to converge on the property saved the state \$160 million more.

The hearing brought out that the per-parcel cost of right-of-way in California has climbed from about \$2,800 in 1942 to \$14,900 in fiscal 1957. It is to avoid the danger of just such cost increases, and to assure contractors of a more stable construction program, that the Bureau of Public Roads is backing the seven-year grace period. Clifton W. Enfield, BPR's general counsel, said that federal officials meantime would like states to purchase right-of-way at least two years in advance of construction schedule.

Twenty-two state highway officials from 17 different states returned to the campus last month for one of the annual highway management conferences sponsored by AASHO and the National Highway Users Conference. Under the academic leadership of business administration professors and prominent industrialists, they probed the internal problems of running a highway department. The "shirt-sleeves" sessions were held at the Georgia Center for Continuing Education.

Roads and Streets has lauded AASHO and NHUC for giving hard-pressed state highway administrators an opportunity to exchange working experiences and to hear top business leaders discuss common management techniques. The results are bound to be greater efficiency and speed in the day-to-day departmental job of developing plans, awarding contracts and seeing that contractors get paid.

B.F. Goodrich



B.F. Goodrich Rock Logger tires can be retreaded 3 times, ready-mix company reports

GRAYSTONE of Olympia, Washington specializes in ready-mix concrete. Trucks travel on and off-the-road in stop-and-go service, rolling over such tire-killers as rocks and steel scraps at construction sites. Yet Graystone finds its tires often can be *retreaded 3 times* with practically new tire service from each retread. Why? Graystone uses B.F. Goodrich Rock Logger tires!

Graystone Dispatcher George Meyer says, "B.F. Goodrich Rock Logger tires give the kind of traction we need in rough weather." Husky Rock Logger cleats dig in to give you maximum pulling power in forward or reverse. "They give rugged dependability around

rough construction work," he adds.

B.F. Goodrich Rock Logger tires are available with FLEX-RITE NYLON cord construction. FLEX-RITE NYLON withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. Result: This B.F. Goodrich cord body outwears even the extra-thick Rock Logger tread, can often be retreaded again and again!

Your nearby B.F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book. See him today, and start enjoying the extra savings B.F. Goodrich tires give. *B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.*

Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment



Smileage!

B.F. Goodrich truck tires

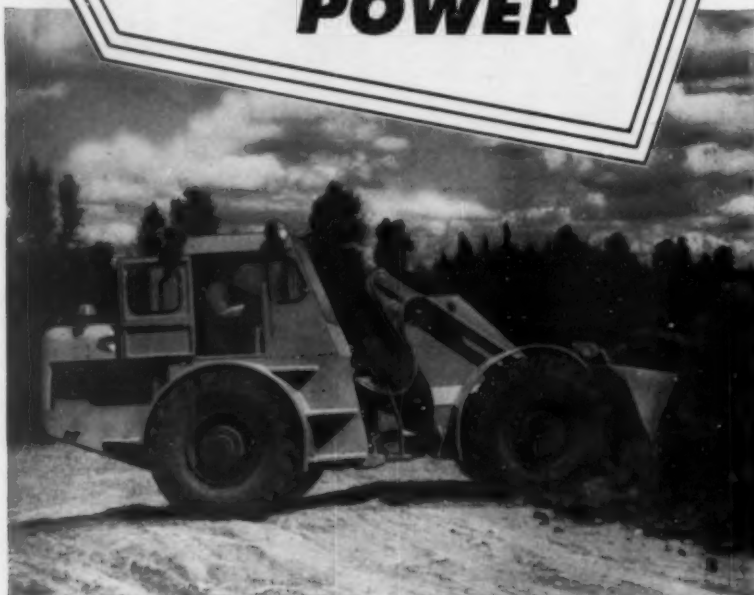
ROADS AND STREETS, July, 1958

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LOADING SHOT ROCK

takes **EXTRA
POWER**



does it easily
with

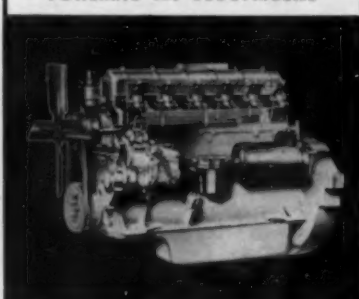
WAUKESHA

Diesel

● Tough stuff to load—that shot rock! Takes a real loader with an engine that can pour on the power. With its Waukesha Diesel, and 100% breakout bucket action, this 1½ cu. yd. LD 5P Scoopmobile handles a lot of yardage for Bowman Sand & Gravel Co., Albany, Oregon—steadily, smoothly, quickly. Four-wheel planetary drive gives power to spare. Power steering, power shift forward and reverse transmission, and 4-wheel power brakes lighten the work of the operator. Waukesha Diesels also give you easy starting, quick warm-up, snappy acceleration, with high fuel economy and most economical upkeep.

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POWERING the SCOOPMOBILE



Waukesha 190-DLC Diesel—Six cylinders, 3¾ x 4-inch, 265 cubic inch displacement. Send for descriptive bulletin 1411.

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LOS ANGELES

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22

This Month's Cover

Shown on the cover this month is the highly mechanized method used by V. N. Holderman and Sons Inc., Columbus, Ohio, in constructing the Route 25 bypass around Lima during the 1957 season.

Bank-run gravel stripped from a nearby pit was delivered to the hopper of a Blaw-Knox base paver, which spread a 10 in. depth of loose material 16 ft. wide for roadway base course.

Next followed a Lima roadpacker, which with its vibrating shoes compacted the material to the specified density in two passes of the machine.

A normal day's production was about 8,000 ft. of 16 ft. wide base strip.

Alternate Bids Asked on West Virginia Paving

The West Virginia state senate recently told the state road commission that it would have to secure bids on flexible heavy-duty asphalt paving, as well as a rigid type paving for Interstate highway construction. This is the result of a resolution in the senate. The commission had previously announced a policy of using rigid type paving exclusively for Interstate system projects.

The debate in the senate brought out the contention that the existing policy would limit bidding to two West Virginia contractors, the only ones organized and equipped to do rigid type paving, but if alternate bids were allowed, 22 other contractors in the state would be able to compete.

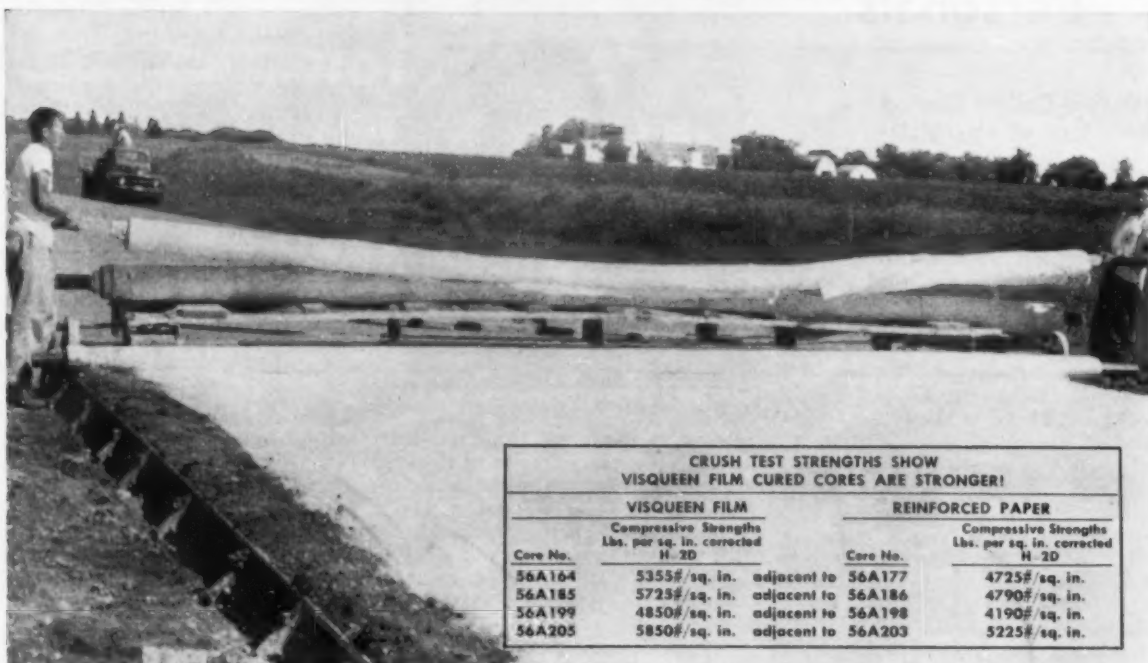
Motorola Awarded \$550,000 Contract By Connecticut

The State of Connecticut Highway Department has awarded Motorola Communications and Electronics, Inc., a half-million dollar contract for a statewide two-way radio communication system. Included in the contract are 350 mobile units and 34 base stations.

The award also includes a Motorola Maintenance Agreement, which places entire responsibility for servicing the system on Motorola. Regular preventive and emergency maintenance will be sub-contracted to independent authorized Motorola Service Stations throughout Connecticut. The contract, written on a 5 year lease basis, involves more than \$550,000.

ROADS AND STREETS, July, 1958

3 Minutes With These Facts Can Put Money In Your Pocket!



CRUSH TEST STRENGTHS SHOW VISQUEEN FILM CURED CORES ARE STRONGER!			
VISQUEEN FILM		REINFORCED PAPER	
Core No.	Compressive Strengths lbs. per sq. in. corrected H. 20	Core No.	Compressive Strengths lbs. per sq. in. corrected H. 20
56A164	5355#/sq. in.	adjacent to 56A177	4725#/sq. in.
56A185	5725#/sq. in.	adjacent to 56A186	4790#/sq. in.
56A199	4850#/sq. in.	adjacent to 56A198	4190#/sq. in.
56A205	5850#/sq. in.	adjacent to 56A203	5225#/sq. in.

ONLY WHITE OPAQUE VISQUEEN FILM GIVES YOU THESE TRADE MARK COST-CUTTING ADVANTAGES FOR CONCRETE CURING

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1. Up to 23 re-uses plus low first cost cut curing costs to a fraction of a cent /sq. ft. of .004" white opaque VISQUEEN film.
2. Lower Labor Costs.
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1. Superior uniformity of thickness. No thin, weak spots. A *stronger* curing blanket—hence greater durability.
2. Far lighter than other materials. Hence easier, more speedily handled. 1,000 sq. ft. weighs only 20 lbs. *Stays* light—will not absorb moisture.
3. Additional watering not needed. Film rolls up easily. Needs no drying or special handling.
4. Inert. No chemical reactions with concrete. Leaves no deposit. Will not rot or mildew.
5. Only VISQUEEN film comes in standard widths—or blankets—and *seamless* widths through 32'. Available in 14' roll widths with no folds.
6. VISQUEEN film is used by road builders and contractors for rain blankets, equipment and material covers.
7. See chart in illustration.

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Personals

Howard Collins Elected President of the Moles

Howard A. Collins, president of Howard Collins Construction Co., Inc. was elected president of The Moles, an association of the outstanding heavy construction contractors and engineers throughout the country, at its recent meeting in New York. He succeeds Richard A. Johnson, president of The Arthur A. Johnson Corp.

Other officers elected were: Mansell L. MacLean of MacLean-Grove & Co., Inc., first vice president; Chester W. Cambell of The Foundation Company, second vice president; Harry T. Immerman of Spencer, White & Prentiss, treasurer; Eugene F. Moran, Jr. of Moran Towing Corp., secretary, and John C. MacElroy of J. C. MacElroy Co., Inc., sergeant-at-arms.

GUY KELCEY, a partner in the Newark consulting engineering



Guy Kelcey

firm of Edwards and Kelcey, was made an honorary Doctor of Engineering at Newark College of Engineering, Newark, New Jersey. He is the eleventh person to receive such a degree from this school since 1919.

Mr. Kelcey is an authority on geometric design of highways, and is one of the deans of traffic engineering, with a broad knowledge of the ramification of urban highway planning and development.

H. S. Mattimore Passes

Horatio S. Mattimore, one of the deans of materials engineers in highway work, died recently in retirement. He was engineer of tests for the Pennsylvania department of highways from 1919 to 1943, and during that period was an acknowledged pioneering leader in his field.

Recipient of the George S. Bartlett award for distinguished service in the cause of highway progress, Mr. Mattimore was chairman or honorary member of numerous committees in the technical societies.

EARL C. PLANETT, of the manufacturing company bearing his name, Downey, California, has been named president of the Wire Reinforcement Institute, Inc. Ford P. Schusler, Sales Manager, Industrial Division, Keystone Steel and Wire Company, Peoria, Illinois, is vice president.

JOHN W. VANCE is now director of public relations for International Harvester Company.

More GIANT Sizes! More GIANT Tread Designs! More GIANT Savings! Now at SOUTHERN TIRE COMPANY!



Probably more dirt and rock is hauled on Southern Tire retreads than on any other retreaded tires. That's because more and more contractors and heavy equipment operators are discovering the superior quality and economy of Southern Tire retreads.

Southern Tire offers not only the country's most complete range of tire sizes and tread designs, but also the world's finest retreading facilities—three-sectional molds that mean no buffing to breaker strips regardless of growth.

These facilities and use of finest tread rubber, plus Southern Tire's long experience, assure better quality with greater economy. Call your tire dealer now for facts about how Southern Tire retreads can save you as much as 40% of the price of new tires yet give you guaranteed new tire service.

● All sizes—from 1100 x 24 to 33.5 x 33



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What's **YOUR** **TRUCK** **CRANE** **JOB?**

NORTHWEST **25 Ton - 35 Ton** **TRUCK CRANES**

ALL OVER THE COUNTRY — from California to New England — from Minnesota to the deep South, Northwest Truck Cranes are proving their versatility in handling jobs of all kinds.

Here is a choice of rubber tired units that bring you a combination of advantages that make money.

Independent High Speed Boom Hoists are ruggedly built for hour in and hour out service — power controlled in both directions and operating independently of all other machine functions, Sectional Boom Hoist Rigging and Pendant Lines, Pivoted Gantries, Telescopic Boom Struts, Adjustable Jibs, Removable Counterweight, 3rd Drums and a host of Carrier advantages all combine to permit the maximum in flexibility to get the job done quickly and profitably.

There is a lot to learn about these machines. Ask for a catalog on the size you need.

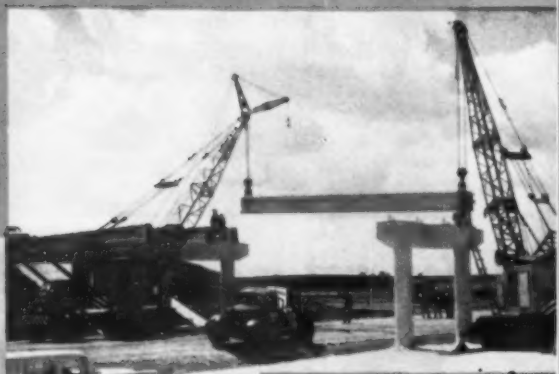
NORTHWEST ENGINEERING COMPANY

1584 Field Building • 135 South La Salle Street • Chicago 3, Illinois



Above: Heavy steel calls for careful handling and accuracy. The Northwest is a 35 ton Truck Crane.

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Above: Two Northwest 25 ton Truck Cranes coordinate smoothly to set a precast concrete Beam on an overpass job.

Left: Northwest 25 ton Truck Cranes are speeding up many concrete jobs. They bring you smooth booming, plenty of reach and perfect control of the load.



Left: A 35 ton Northwest Truck Crane resets a large concrete tank.

NORTHWEST

Always Ready to **GO**

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS
¾ Yd. to 2½ Yd.
Capacity

CRANES
13-Ton to 30-Ton
Capacity

DRAGLINES
¾ Yd. to 3 Yd.
Capacity

PULLSHOVELS
¾ Yd. to 2½ Yd.
Capacity

TRUCK CRANES
25-Ton and 35-Ton
Capacity



For mechanical • cement • bituminous • lime • chemical and
lime-fly-ash stabilization of: Highways • Streets • Airports
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**SOIL STABILIZATION FOR
HIGH TYPE PAVEMENT
BASE REQUIRES THIS
QUALITY SPECIFICATION
FOR PROCESSING:**

"Mixing of soil and/or soil combination and additives shall be accomplished by the use of a single pass traveling mixing plant of the type which leaves the material spread for immediate compaction."



You get laboratory design every foot of the way with **P&H** SINGLE PASS STABILIZATION METHOD

You can maintain consistent laboratory precision in uniformity of mixing right on the job to insure building sub-bases exactly as you designed them when you specify the single pass method of soil stabilization.

The P&H Single Pass Soil Stabilizer is designed and built specifically to conform with the single pass stabilization method, *regardless of soil*. Only P&H offers a true, single pass traveling mixing plant. In a single pass, with one operator, at a rapid rate of speed, it performs these exacting operations:

1. Proportions materials in accordance with laboratory design.
2. Pulverizes fine grained soil.
3. Blends all materials uniformly.

4. Adds specified amount of liquids accurately.
5. Mixes all materials to a high degree of uniformity.
6. Spreads materials to a uniform loose density for compaction.

On *all* types of single pass operation, P&H will give you accuracy, speed and economy.

In designing your next sub-base structure, it will benefit you to have a copy of the P&H File-Folder series, "Low-Cost Highways". Write Department 571-A, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

Construction & Mining Division
Milwaukee 46, Wisconsin

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Traffic Safety

Entire New York Thruway To Be Edge Striped

The pavement throughout the 506 miles of the New York State Thruway is to have reflectorized striping along both edges of the pavement on each roadway.

In announcing the decision to use this type of striping to supplement center line striping, officials of the Thruway authority noted that it would help further reduce the already low accident rate on this facility. Pavement edge stripes have been used previously only at bridge sites.

In the Buffalo district, yellow paint will be used experimentally on 298 miles, to test effectiveness in all weather. Elsewhere white reflectorized paint will be used.

The striping program is being handled during the present summer by a 10-man maintenance crew in each of the Thruway's four divisions. Each crew is equipped with a mechanical striping machine, and four trucks, and is protected from traffic mishaps by State police patrol.

A single crew normally has applied 30 miles of stripe each day, weather permitting. The striping machine has been modified so that one edge and the center stripe are applied on a single run. The other edge is painted on the return trip.

The striping project will require 47,000 gal. of paint and about 235,000 lb. of reflective glass beads.

Accident Causes on the Pennsylvania Turnpike

An analysis of the 1,930 traffic accidents which occurred during 1957 on the Pennsylvania Turnpike showed that 63 percent occurred in daylight, 71 percent in fair weather, 63 percent on dry roadway, and 55 percent were single-vehicle accidents, in which the other driver could not be blamed.

These were the findings of the report recently made by safety director Harold S. Roberts of the Pennsylvania Turnpike Commission. The fatal accident rate for the year was 2.58, a considerable drop from former years.

● The New Jersey Turnpike Authority plans to install a barrier in the median of its highway from Linden to Elizabeth, a distance of about three miles.

BIGGER PAY LOADS

with **OWEN**
aluminum buckets



The combination of alloy aluminum plate with steel in the bowl construction of material handling buckets . . . 2½ cubic yards and over, eliminates up to 1000 pounds of dead weight. This affords a like amount of increase in pay load when rehandling comparatively light, free-flowing materials.

The exclusive feature of the closing line lead in the center plane of the bucket eliminates sharp bends at the guide sheaves and rollers, thereby increasing the life of the closing cable from 75% to 100%.

Long, internal main-shaft bearings insure permanent jaw alignment with minimum wear. Write for further details.



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WE'LL STAY WITH STANDARD"

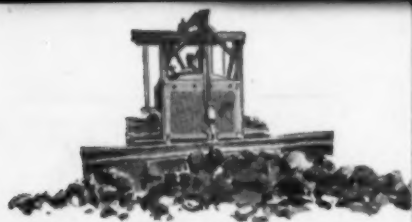


ON-THE-SPOT

technical service,
products that never fail

keep Palumbo Excavating Company buying STANDARD

FUELS and LUBRICANTS



In 1901 Joseph Palumbo found that Standard Oil lubricants worked best to keep the horse-drawn wagons rolling smoothly. Later, in 1920, his son Samuel Palumbo founded Palumbo Excavating Company. For 56 years Standard has satisfied the company's every petroleum need.

Peter A. Palumbo, general manager of the company and grandson of its founder, tells why: "Standard's products are superior. The service is 100% . . . anywhere we have a job. We've never experienced delays from Standard Oil; I have confidence in the name Standard."

For instance, on the project pictured on this page, as on all its jobs, Palumbo has found that Standard provides the right combination to keep equipment constantly on the job: STANOLUBE HD-M Motor Oil and the technical know-how supplied by Standard Oil automotive lubrication specialists.

STANOLUBE HD-M gives superior service under grueling conditions. It is refined from highest-quality base stock. As a result of Standard Oil research, STANOLUBE HD-M is formulated with an additive that prevents bronze wrist-pin bushing corrosion. Other additives retard oil oxidation, minimize formation of piston ring deposits, prevent formation of excessive varnish and sludge and prevent corrosive attack on bearing metals. Standard's trained specialists spend hours on the job site to make sure equipment is never down for lack of fuel, lubrication or service.

This dependable combination—highest-quality products, promptly delivered, and skilled technical service—can be yours, too, anywhere in the 15 Midwest or Rocky Mountain states. Call your nearest Standard Oil office. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

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Putting Expressways Together. Excavating for interchange joining three major Chicago-area expressways, the Palumbo Company is moving 472,000 cubic yards of earth. Here are Peter A. Palumbo, John L. Bugatto of Standard Oil and Charles Bohac, general superintendent for Palumbo. John prepared for the technical advice he gives on jobs like this by obtaining an engineering degree at the University of Illinois. He has also completed Standard's Sales Engineering School.



YOU EXPECT MORE FROM **STANDARD** AND GET IT!

Motor-minded Palumbos: Fourth generation. Joey and Sam, Peter Palumbo's sons, riding in their motor-driven car, hand-built by their dad. In background is one of the company's heavy-duty trucks used at the expressway project. Standard Oil fuels and lubricants keep the Palumbo equipment dependably on the go.



**Save
MONEY, TIME
and
LABOR-**

GALION 503 Grader with VIBRATORY COMPACTOR

TWO UNITS IN ONE!



GRADE AND COMPACT WITH SAME MACHINE!

This combination of 503 Grader and Jackson Vibratory Compactor does the work of two basic machines—thereby reducing equipment investment. There is no interference with ordinary grader operations such as spreading and leveling. However, the compactor is easily removed to permit full grader operations.

The vibratory compactor will accomplish most specified densities (including Proctor, Modified Proctor, and AASHO-T99-49) often in ONE pass.

With this combination you save . . . on equipment, labor, operating and overhead costs.

HIGH-SPEED MOBILITY—on the job and between jobs!

Compactor is easily raised or lowered by hydraulic power controlled from operator's platform. Permits the high speed of the grader to be utilized for maneuvering and dead-heading on the job and traveling between jobs. Saves time, permits more work to be done per day.

Write for literature.

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PROVIDES MULTI-PURPOSE USE!

Individual compactors may be detached and used as manually-guided, self-propelled compactors for confined areas inaccessible to multi-unit machines.

Compactor power unit can be used as a lighting plant or for operation of small power tools.

GALION
ESTABLISHED 1907



MOTOR GRADERS & ROLLERS

ROADS AND STREETS, July, 1958

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Just 27 minutes with your International Distributor will show you:

How a multiple-duty four-in-one over old-style

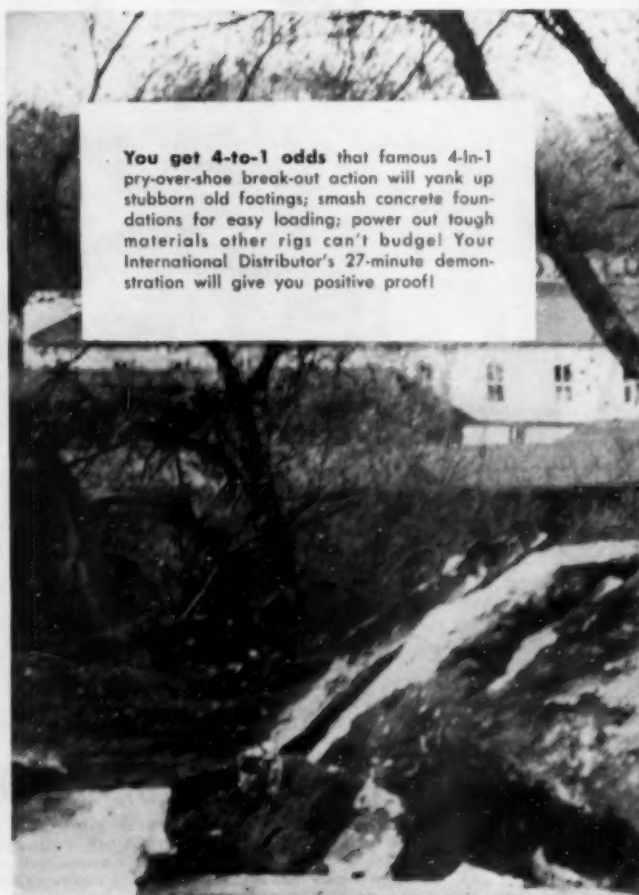
Get in the driver's seat. Grab hold of the machine-selector lever. See what it means to command the 4-to-1 advantages which only an International Drott 4-In-1 can give you—in multiplied profit opportunities; in getting 4-machine utility for one moderate first investment; in cutting labor and operating cost. Find out why nimble 4-In-1's are snatching profitable jobs from "under the buckets" of far costlier boom-type rigs! Measure the extra value of exclusive shock-swallowing Hydro-Spring performance-protection. And prove to yourself that the 4-In-1 can outdig and outload any "single-action" excavator loader! Ask your International Drott Distributor now for the 27-minute 4-In-1 demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL®
DROTT®

You get 4-to-1 odds that the 4-In-1, bottom-dumping as a clamshell, will give you positive self-cleanout of sticky, gummy materials—even the kind that clings like bread dough inside ordinary buckets! You get big odds, too, that 4-In-1 bottom-dumping will give you a load-heaping dumping—height advantage of up to 30 inches over ordinary roll-forward dumping!



You get 4-to-1 odds that famous 4-In-1 pry-over-shoe break-out action will yank up stubborn old footings; smash concrete foundations for easy loading; power out tough materials other rigs can't budge! Your International Distributor's 27-minute demonstration will give you positive proof!

You get 4-to-1 odds that the 4-In-1 as a "carry-type scraper" will grade, strip, or spread—will give you these accurate, big-capacity actions that "single-action" loaders can't even begin to attempt! You'll get eye-witness evidence, in this 27-minute demonstration, that this labor-saving 4-In-1 action can pile up profits for you, on job after job!



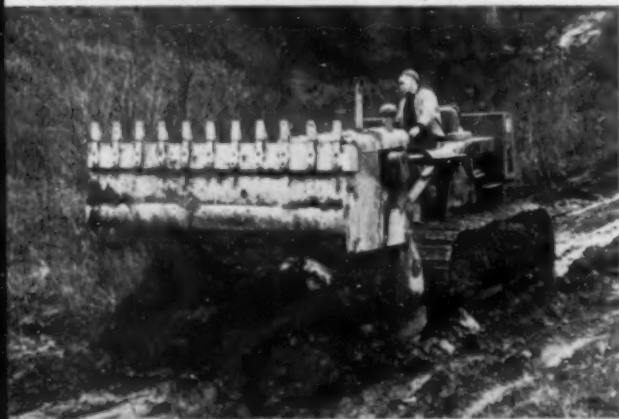
gives you ***4-to-1 odds***
"single-action" loaders!



You get 4-to-1 odds that you'd need a bona fide, full-sized blade outfit, and a good one, to match the earth-rolling, hard-material-digging performance of the 4-in-1 as a bulldozer. You'll be amazed at the ease of regulating dozing depth with "radius control." This TD-14 4-in-1 is reconditioning a coal mine haul road in Floyd County, Kentucky!

... for more details circle 281 on enclosed return postal card

You get 4-to-1 odds that the 4-in-1, as a clamshell, will pick up, carry, and load bulky, heavy, odd-shaped materials impossible for single-action rigs even to get in their buckets! This TD-6 4-in-1 is carrying a big chunk of concrete footing from excavation to truck. And as a clamshell, the 4-in-1 gives you a space-saving, one-gulp bucket fill especially in loose materials!



New Publications

Rural Mountain Highway Capacity Studies

Data on the traffic capacity of highways in mountain areas have been compiled in an article entitled "Methods for Determining Capacity of Rural Roads in Mountainous Terrain." This report by O. K. Normann, Bureau of Public Roads, James O. Granum, Automotive

Safety Foundation, and Harry C. Schwander, West Virginia State Road Commission, is published in Public Roads, June 1958 (Vol. 30, no. 2). Copy available for \$.20 remitted to Superintendent of Documents, Government Printing Office, Washington 25, D. C.

New Asphalt Reference

Design and Construction of Asphalt Pavements. By J. Rogers Martin, Engineer-Manager, Hot Mix Asphaltic Concrete Associa-

tion of Oklahoma; and Hugh A. Wallace, Managing Engineer, Southwest Division, The Asphalt Institute. 312 pages, 6x9, illustrated. Price \$11.50. McGraw-Hill Book Company, 327 West 41st St., New York 36, N.Y.

This thorough manual of modern methods and technology for the design and construction of the many types of asphalt pavements in use today, has just been published by the McGraw-Hill Book Company. Holding to the viewpoint of the person actually responsible for the design and construction of roads, it deals with such subjects as types of asphalt pavements, petroleum asphalts, mineral aggregates, design of hot-mix asphaltic concrete, construction of hot-mix asphaltic concrete pavements, asphalt pavements and bases employing liquid asphalts, surface treatments and seal coats, reconstruction of old pavements, design of the flexible system, testing procedures, and design methods. The techniques presented in this book represent major practices throughout Continental North America.

The author's treatment is completely practical, yet it includes the essential theory needed for a broad understanding of the principles involved in good design and construction. The volume also includes testing exercises to give a working knowledge of the fundamentals of control and design testing.



Lima Roadpacker owned by N. H. Garman & Bros., Inc., Reading, Pa. Shown working on highway widening job on U. S. 22, near Harrisburg, Pa. Work involved widening outer strips of 4-lane highway by 33-in. The trench, 9-in. deep, was first lined with a 1½-in. cushion course of screenings. The entire 9-in. lift of 4-in. stone was then tightly keyed in two passes of the Roadpacker. It took only two applications of dry screenings to fill the voids.

"LIMA ROADPACKER DOES GREAT JOB" says H. S. Garman

"We were looking for a better compactor," says Harold S. Garman of N. H. Garman & Bros., Inc., paving contractors of Reading, Pa., "and we really found it in the Lima Roadpacker. Before we made the purchase, we tried out the other leading makes. The Roadpacker proved to be the fastest machine of the lot, and did a better job of compacting to the state's tough specs. On one job we compacted to 97% of the solid rock weight.

"To get real speed on the job (picture above) we used the widening attachment, which permits two shoes to be hooked up one behind the other. This was very successful and allowed us to finish the operation in record time. Recently, using the complete set of six shoes, we set what we think might be another record when we compacted over 2200 tons of aggregate in an 8-hr. shift. For my money, the Lima Roadpacker does a great job."

Get all the facts on the new Lima Roadpacker—
write for free bulletin and see your local distributor

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN · LIMA · HAMILTON

Shovels • Cranes • Draglines • Pultshovels • Roadpackers • Crushing, Screening and Washing Equipment



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Speed and Accidents

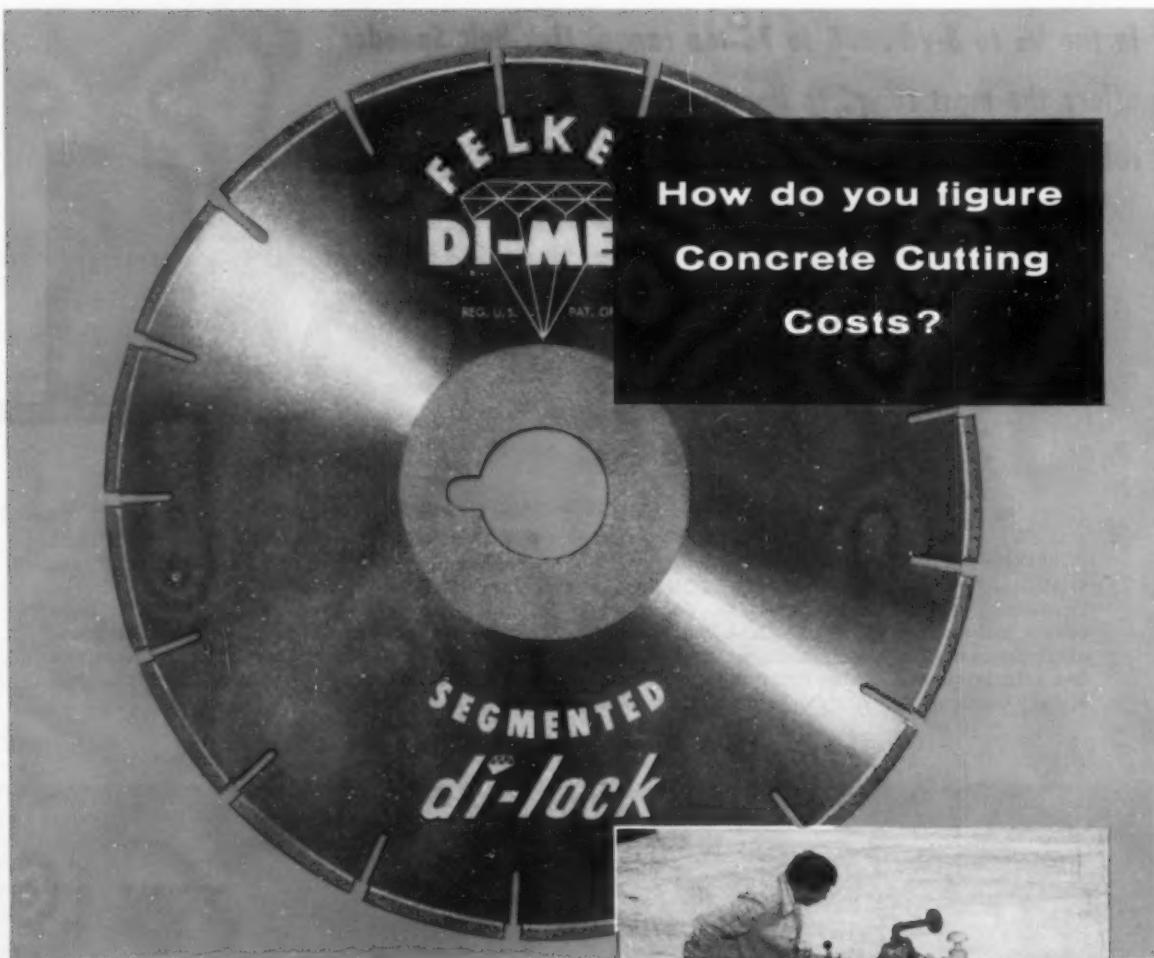
How often is speed a factor in traffic accidents? What are the respective speed limits in the 48 states? Which are more valuable—one-man or two-man police units? Those are some of the questions answered in "Speed Regulation," a recent publication of the National Safety Council.

The 38-page booklet was prepared by the Committee on Speed of the Council's Traffic and Transportation Conference. A single copy free on request. For further quotation on quantity prices, write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Steel Highway Bridges

"Highway Bridges of Steel" is the title of a 32-page publication, issued by The American Institute of Steel Construction, 101 Park Avenue, New York, N. Y.

(Continued on page 36)



One contractor estimated his on a cost/foot basis and was surprised at the outcome with

di-lock Diamond Blades

On a large airbase job the contractor had 450,000 lineal feet of control joints to be sawed to a depth of $3\frac{1}{8}$ to $3\frac{3}{8}$ inches. When bidding this job he estimated blade costs at 25 cents per foot—a figure which he felt dangerously low for the conditions encountered. Here's how the job shaped up in actual production.

Using a multiple blade saw equipped with two Felker Di-Lock FDC-60 blades, 5535 lineal feet were cut before blades were exhausted. Reducing this total footage to cost per foot, the astonishing figure of 9.2 cents per foot was obtained...little more than $\frac{1}{3}$ of the original estimated cost!



Felker manufactures a complete line of concrete saws from 36 h.p. (illustrated above) to 9.2 h.p. models. Ask for literature and prices.

FELKER DI-LOCKS SETTING RECORDS FROM COAST TO COAST

Whatever the application...on concrete, on masonry materials of all kinds, in hard, tough going you'll find longer life, more cutting speed, lower ultimate blade costs when you specify Felker Di-Lock Diamond Blades! Ask your Felker distributor to recommend the best bond type for your material. You'll be happy with Di-Lock's results!



FELKER MANUFACTURING CO.

Torrance, California

World's largest manufacturer of Diamond Abrasive Cut-Off Blades and Machines

**In the ½ to 3-yd . . . 8 to 75-ton range, Link-Belt Speeder
offers the most complete line of crawler and
rubber-tired shovel-cranes . . .**

31

Here's an opportunity to get exactly the machine you need . . . capitalize on scores of advance design features such as—

● **HIGH-SPEED, NON-FATIGUING CONTROLS:** Productivity can go up as much as 25% due to the control system alone. And only Link-Belt Speeder offers Speed-o-Matic power hydraulic controls for fast, safe, precision . . . easy, fingertip operation that actually encourages the operator to push the machine

to its high limit *throughout the shift!*

● **BONUS USABLE HORSEPOWER:** Similarly rated shovel-cranes, using the same make and model engine, deliver widely varying amounts of power at the drums. The strength of structural and power train components plus anti-friction bearings, machine cut gears, and splined shafting mean a Link-Belt Speeder can take full advantage of available engine power . . . bull through toughest cuts.

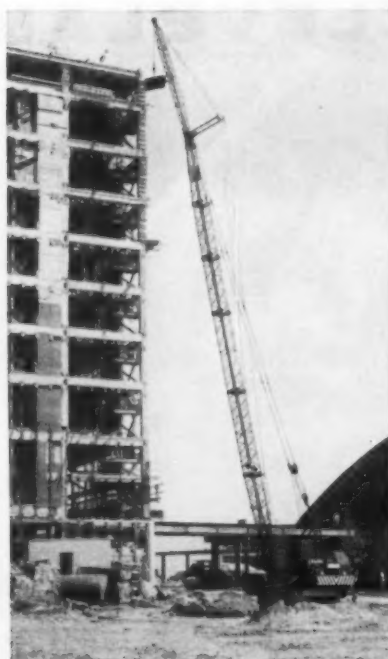


PROFIT MAKERS

● **MORE STANDARD FEATURES, MORE OPTIONS:** With a Link-Belt Speeder you get many profit-making standard features that may not even be furnished as optional features on other machines. And, in addition to these standard features, you can choose from an exceptionally wide range of optional features which tailor the machine for extra profits.

For detailed information on Link-Belt Speeder's 31 profit making shovel-cranes, see your distributor or write: Link-Belt Speeder Corp., Cedar Rapids, Iowa.

14,000



6 BIG-CAPACITY TRUCK-CRANES
—all with optional remote control



4 SELF-PROPELLED MODELS



21 FAST AND RUGGED CRAWLER MODELS

LINK-BELT SPEEDER



21 crawlers



6 truck-cranes



4 self-propelled

It's time to compare . . . with a Link-Belt Speeder

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ROADS AND STREETS, July, 1958

CLEVELAND 80W



LAYS PIPE



**FILLS TRENCH
from
either side**



TAMPS, TOO

Does all three jobs better—with only one operator

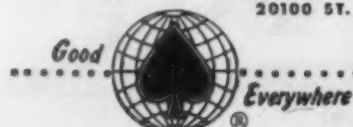
Lays pipe • 30,000 foot-pound capacity—power boom, up and down • 4 line speeds • long reach, 21 feet • sets hydrants, valves • unloads, strings • pulls street crossings • handles headache ball.

Backfills fast—from either side of trench • 20 passes per minute • 4½ foot scraper board • backfills clean • stays off completed work • works safer, parallels work • fits all job conditions.

Tamps as it fills • meets rigid density specifications • tamps from the bottom up • parallels work, no straddling • tamps wider, tamps safer • breaks concrete • reduces haul-out • saves clean-up.

The CLEVELAND TRENCHER Co.

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New Publications

(Continued from page 32)

Published at a time when thousands of new bridges are being planned for the interstate system and other highway work, this publication puts together under one cover much useful data on steel bridge design and construction. Numerous structural details reflecting current practice are included.

The first part of the brochure discusses the economy of steel, aesthetics, welding, high strength bolting, structural low alloy steels, erecting procedures, steel decking and composite design.

Free copy available on request to the above address.

Air-Entrained Concrete

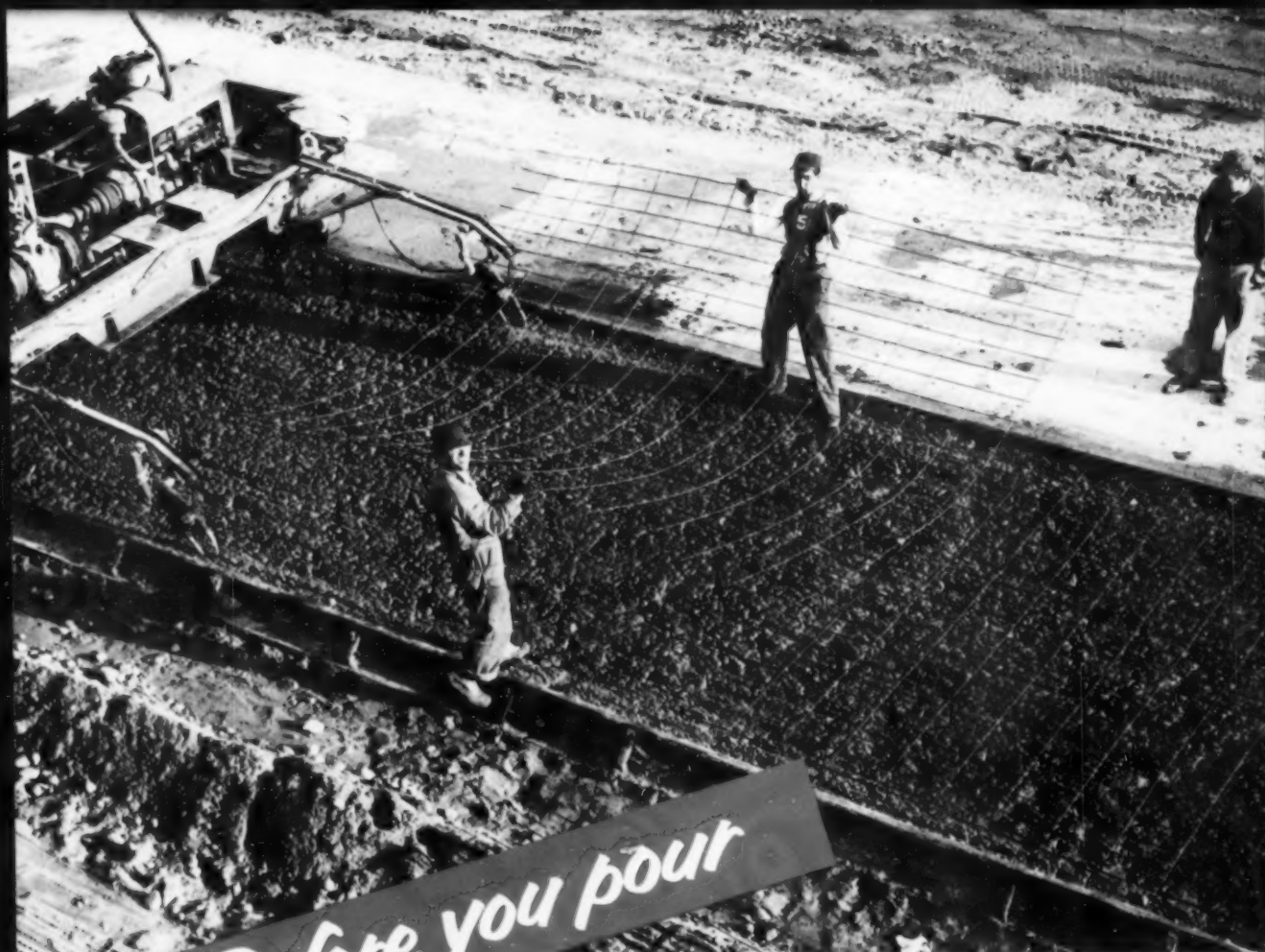
"Use of Air-Entrained Concrete in Pavements and Bridges" (revised edition); Current Road Problems Series, pamphlet No. 15-2R Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C.

This edition replaces the original one of which 15,000 copies were distributed since 1946. Published with permission of the American Society of Testing Materials, the new edition contains the ASTM specifications. Also a suggested procedure for design and control of mix, and other useful data.

"DESIGN OF CONCRETE STRUCTURES" (6th edition) McGraw-Hill Civil Engineering Series. Leonard C. Urquhart, Charles E. O'Rourke, and George Winter. 536 pages. Price \$8.00. McGraw-Hill Book Company Inc., 330 West 42nd Street, New York 36, New York.

This edition, like its predecessors, gives enough development of theory to insure the beginner a good understanding of fundamentals. The authors cover the entire field of customary reinforced concrete design except certain highly specialized structures. Complete design examples are given, and emphasis is placed on a thorough discussion of basic structural performance.

This edition reflects all changes in the revised A.C.I. Building code (1956), including ultimate-strength design as a permissible alternate.



Before you pour

order **CLINTON WELDED WIRE FABRIC**

Much heavier traffic loads predicted for the future will place heavy demands on concrete highways currently being constructed. Progressive highway departments are assuring both present and future performance of highways by reinforcing them with Welded Wire Fabric.

CF&I Clinton Welded Wire Fabric reinforcement minimizes cracking during setting, and gives concrete greater impact-resistance because it spreads the load evenly. It increases tensile strength to mini-

mize the effect of temperature extremes—helps prevent warping and heaving. Should a crack develop, the fabric holds it tightly together, preventing earth and moisture from entering and expanding it.

You can depend upon Clinton Welded Wire Fabric to reduce maintenance costs to an absolute minimum, and to add extra years to road life. You'll find it the least expensive, most effective way to make today's roads equal to the loads of tomorrow.

WHEN THEY ASK...

"is it Reinforced"

SAY YES...WITH **CLINTON WELDED WIRE FABRIC**

THE COLORADO FUEL AND IRON CORPORATION: DENVER • OAKLAND • NEW YORK





Before you order

specify **CLINTON** **WELDED WIRE FABRIC**

Concrete pipe must have exceptionally high structural strength if it is to give long years of service without cracking or leaking. And the least expensive, most effective way to provide this strength is to reinforce pipe with Welded Wire Fabric.

CF&I Clinton Welded Wire Fabric, in addition to helping concrete resist cracking, provides the concrete pipe with the ability to withstand the stresses induced by high fills and internal water pressure.

Should a crack develop, the fabric holds the concrete firmly together, preventing crack expansion and subsequent leaking. Fabric is especially important in sewer and culvert pipe, where enlarged cracks could mean complete failure.

Consider these advantages, and you'll see why concrete pipe reinforced with top-quality Clinton Welded Wire Fabric is the easy, modern way to provide dependable pipeline performance.

WHEN THEY ASK...

"is it Reinforced"

SAY YES... WITH

CLINTON
WELDED WIRE FABRIC
THE COLORADO FUEL AND IRON CORPORATION



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CF&I OFFICES IN CANADA: Montreal • Toronto CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg



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Unique to Reo are the close tolerances held in the building of Gold Comet Engines—both V-8's and 6's. Engine sleeves, pistons, connecting rods and piston pins are atmospherically conditioned and fitted in an even 70° temperature. They are then assembled in an airconditioned, dustproof chamber where a 70° temperature is maintained the year 'round. Piston pins to piston, for example, are selected to within $\frac{1}{2}$ of one-tenth of one-thousandth of an inch. Then actually *palm pushed* into place while all parts are at the exact same temperature.

No truck engine in America is built with more rigid controls over quality.
REO DIVISION, The White Motor Company, Lansing, Michigan.



G O L D S T A N D A R D O F V A L U E S

Ready-Mix in the Highway Program

Third and concluding part of a round-up review. This series has underscored the tremendous role that ready-mixed concrete will play in highway work, principally in structures and including substantial paving yardage in a few states.

California—F. N. Hveem, materials and Research Engineer: Difficulties in using ready-mix concrete in pavement construction lie in inability to discharge concrete from truck mixers or truck agitators of the dry consistency specified and inability to deliver ready-mixed concrete at a rate conducive to good finishing operations. Our specifica-

tions require delivery in agitator bodies.

The problems of inspecting and testing ready-mixed concrete are numerous. Among them are the question of securing adequate mixing when hauls are short, control of slump, checking a large number of truck mixers for ability to mix and discharge without segregation and enforcing the limit on time of haul when the plant is distant from the site of the work.

One of the problems for which we apparently have arrived at a satisfactory solution, is connected with the identification of cement. For many years we have accepted ce-

(Continued on page 44)

YOU'LL GET UNHEARD-OF VALUE



in the ROGERS Top Value Trailer
CAPACITY 25 TONS—WEIGHT ONLY 9000 LBS.

TOP VALUE In Light Weight—

Weights only 9000 pounds to rate 25 tons capacity with a liberal factor of safety through the use of high strength alloy steel.

TOP VALUE In Low First Cost—

Made possible by long, specialized experience—advanced engineering—unexcelled facilities and volume production.

TOP VALUE In Basic Requirements—

Rogers—pioneer builders—know basic requirements and how to build them into trailers.

TOP VALUE In Wide Adaptability—

Open type bed permits the handling of the greatest variety of loads.

TOP VALUE In Easy Loading—

The "beaver tail" extension permits easier loading and the handling of longer loads.

The flat, unobstructed gooseneck supports blades, buckets, etc.

TOP VALUE In Easy Handling—

Rogers correct weight distribution combined with light weight assures easy hauling at lower cost.

TOP VALUE In Fast, Easy Braking—

assured by Rogers standard brakes—widely recognized for high efficiency, safe action and long wear.

TOP VALUE In Returns On Investment—

Save four ways—in first cost—in lower fuel cost—in longer brake service—in low maintenance cost.



TREMENDOUS
VERSATILITY TOO
IS FEATURED IN
THIS ROGERS
TRAILER

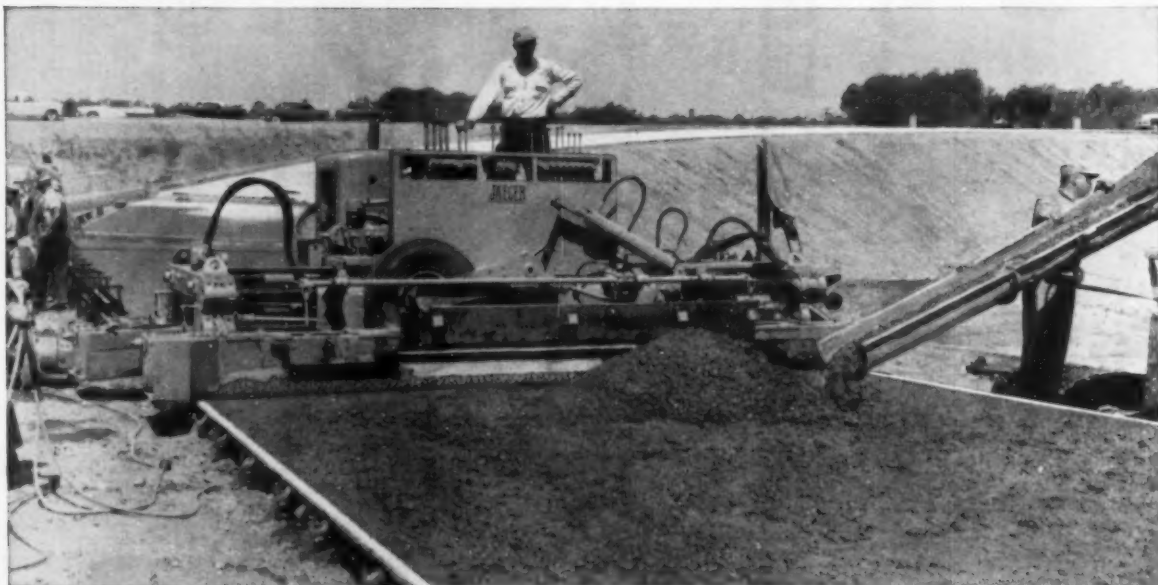
Get Complete Information—Be Surprised And Pleased
At The Advanced Construction And Low Cost.

ROGERS LOW BED—HEAVY DUTY TRAILERS

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Export Office: 50 CHURCH ST., NEW YORK 7, N. Y., U. S. A. Cable Address "Broscites"



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ALL-HYDRAULIC, SELF-WIDENING FINISHER: Fast, flexible, precision-smooth. Gives you 6' of infinite width adjustability with the touch of a lever—a tremendous time-saving on today's work. Gives you hydraulic drive and lever control of traction, screeding, diagonal rear screed swing, tamper attachment and transportation wheels. No

mechanical transmissions; gear-type hydraulic pumps power every operation. Diagonally adjustable screed, supplied for pitched slab and super-elevated curves, lays flush to higher form; single lever changes screed crown as needed. For variable width work, 3' screed extensions have end shoes which adjust to any width, by worm.

How Jaeger machines cut paving costs



NO OTHER SPREADER CAN DO THIS: Perfect spreading and placement of concrete against both forms, even on super-elevated curves, is just one of the exclusive advantages of the Jaeger Screw Spreader. Its screw action completely remixes and densifies the piled material and compacts it solidly against the subgrade and forms, resulting in a uniformly stronger slab free from honeycomb. Can be supplied with oscillating 12" screed for precision strike-off ahead of finisher for maximum production. Jaeger Spreader-Finisher "teams" have laid up to 7280' of 12' turnpike slab in a single 13-hour day, with big cost savings.



LOW COST SPREADING OF AGGREGATES: Lay all the tonnage your trucks can deliver with this inexpensive paver-type Aggregate Spreader—any base or surface aggregate, or plant-mixed stabilized soil for highway or airport base, both base and top for secondary roads, parking areas, drives. Lays widths to 13', up to 10" thickness of coarse stone, or as much as 12" of finer or graded materials. *All traction is on subgrade, never on loose, newly-laid material.* No displacement to cause high and low spots which compress unequally. Floating straight edge runners carry strike-off assembly, average out subgrade irregularities, insure smooth, accurate lay.

For full information on these machines and methods, operating data and prices, see your Jaeger distributor or write us.

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AIR COMPRESSORS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS

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P&H announces world's greatest truck crane 70 tons at 15 ft. radius

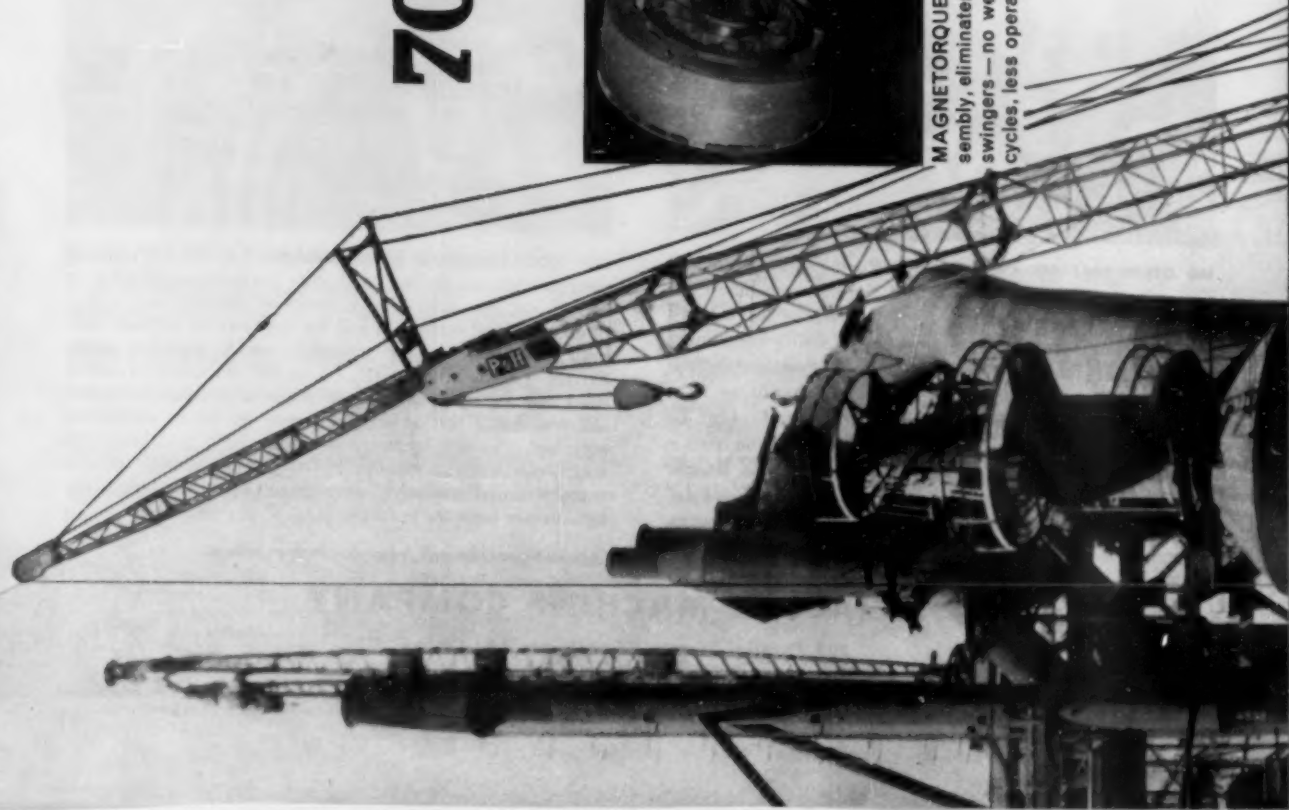
Here's another example of P&H design leadership in meeting contractors' needs for larger capacity equipment to hold down costs and do more work at a greater profit.

It's the big P&H 775-TC. An innovation on rubber. Handles 200 ft. of boom and jib. Smooth "stepless" swing movement of the boom with capacity load is the result of an electro-magnetic swing assembly. It's called Magnetorque®, exclusive P&H development appearing for the first time on a truck crane.

A full 70-Ton capacity at a practical 15' radius. This tremendous lift and reach are combined with exceptional truck crane mobility in the 775-TC. Superior P&H engineering has scientifically distributed the weight over four axles to allow highway travel.



MAGNETORQUE, the electro-magnetic swing assembly, eliminates swing linings and friction on your swingers — no wear, no adjustments — faster work cycles, less operator fatigue, increased production.

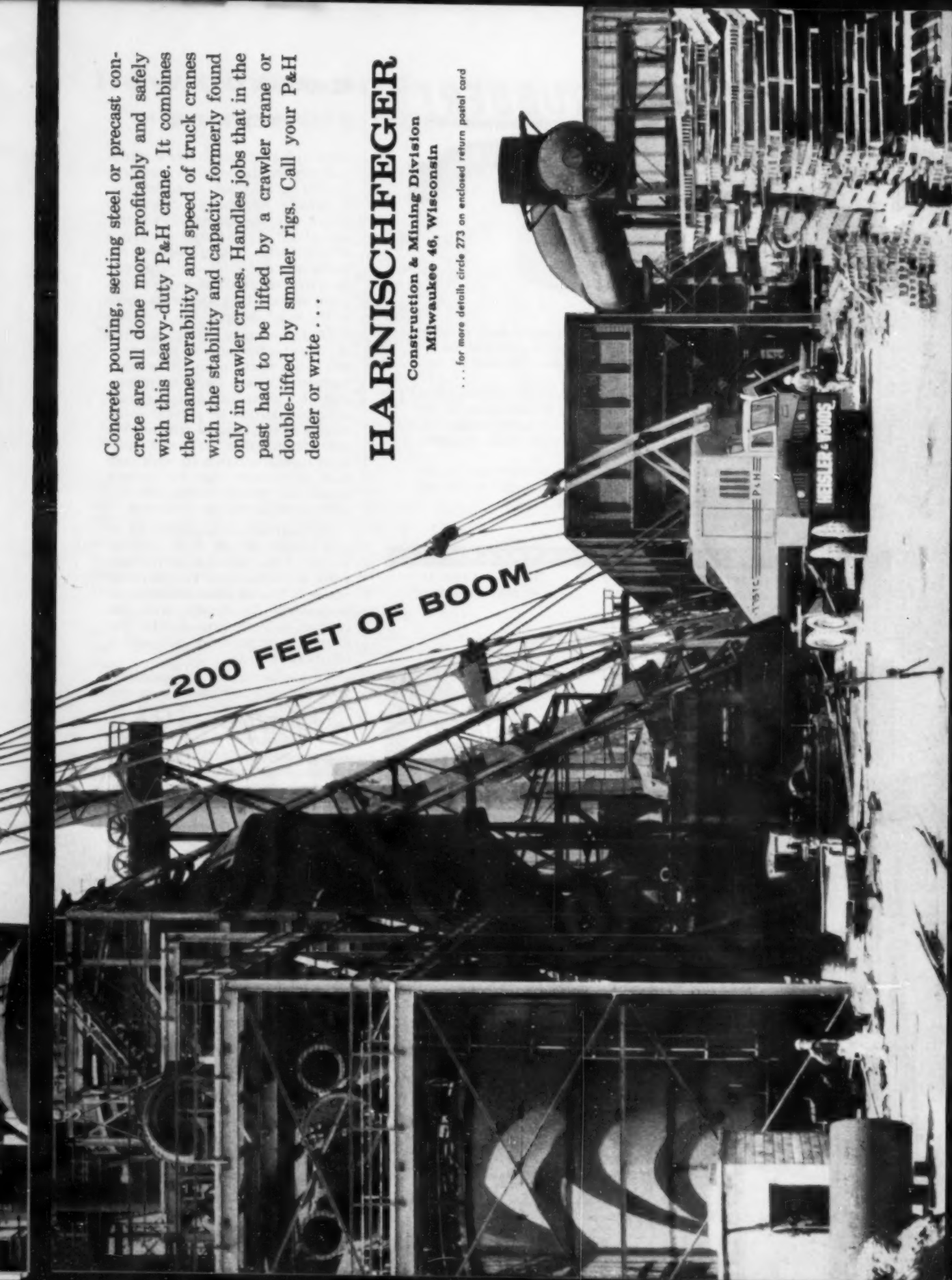


Concrete pouring, setting steel or precast concrete are all done more profitably and safely with this heavy-duty P&H crane. It combines the maneuverability and speed of truck cranes with the stability and capacity formerly found only in crawler cranes. Handles jobs that in the past had to be lifted by a crawler crane or double-lifted by smaller rigs. Call your P&H dealer or write . . .

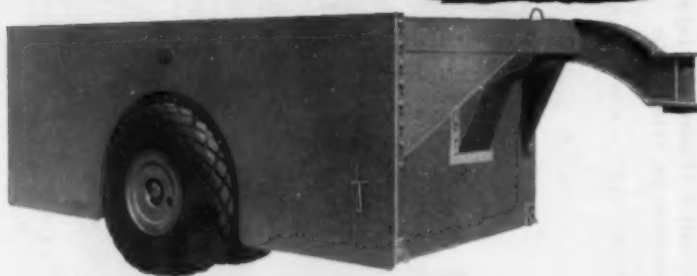
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Construction & Mining Division
Milwaukee 46, Wisconsin

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PULL IT WITH RUBBER!



Versatility

Meet latest specifications for high speed compaction with Tampo 50 ton models designed to get full power from rubber tired tractors. Efficient on wet, silt and clay fills.

Stock Tongues

Interchangeable tongue designs for two and four wheeled tractors make proper connection to the tractor king post. Available for Euclid, Caterpillar, and Model C Tournamatic. Write today for other models.

Wheel oscillation gives equal pressure and kneading action. Tire air pressures from 90 to 150 psi compact soft spots and voids.



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Here's How it Works:

Clark forms are specially designed for modern high speed construction. The exclusive Wedge-Lok and self aligning stake pocket feature reduces form setting time to a minimum. Joint deflection is eliminated.

Ask your Dealer to show the complete Wedge-Lok line of curb and gutter forms and sidewalk forms.

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READY-MIX

(Continued from page 40)

ment on a manufacturer's certificate of compliance subject to check tests of samples taken on delivery. It became increasingly difficult to secure samples delivered to ready-mix plants, which frequently arrive at odd hours. Further, it was virtually impossible for our inspectors to trace our certified cement into plant storage bins and from there to the weigh hopper.

Most ready-mix plants use types of cement different from that specified in our work, in supplying other customers. It was found frequently that the plant had not exercised sufficient caution to prevent intermixing of two types of cement. We now require that ready-mix operators furnish a certificate with each load of concrete that the cement contained therein meets the requirements of our specifications.

We instruct our inspectors to secure samples for our check test from the weigh hopper or from the conveyor to the hopper. The plant operator is free to make whatever arrangements he desires with the cement mill to furnish him the guarantee he needs for purposes of certification to us.

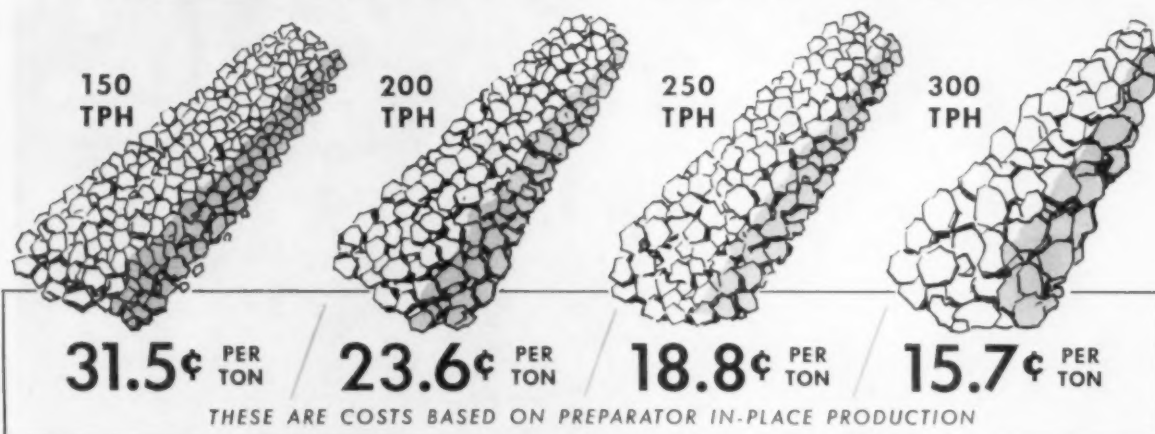
Since placing the responsibility with the ready-mix plant for proper segregation of cement meeting our specifications from other types, we have experienced only infrequent and minor departures from our test requirements as indicated by regular check testing of samples taken at the plants.

Idaho—L. F. Erickson, Materials Engineer: We have not made any change in our specifications because of ready-mix concrete other than to limit the time batching and placing, mixing speeds, etc., as recommended by the National Ready-Mix Association or the A.C.I.

We have found it necessary to keep an inspector at the batch plant when taking concrete for state use. These inspectors observe the actual batching and write a ticket giving the time that the truck left the plant, quantity of water in the mix, etc., so that the inspector on the job knows the time in transit. On longer hauls, the ready-mix plants have sometimes batched the aggregates at the plant, adding cement and water on the project. This method generally is used only when small pours are made.

(Continued on page 48)

How do the prices you pay for subbase materials compare with these?



In-place production of subbase materials from win-drowed bank-run or native over-size materials by the BROS Preparator is producing outstanding cost savings in many parts of the country and the world. The costs per ton shown here are based on conservative averages; compare your present material costs with them. The Preparator can make sizeable cost savings for you, too.

Cost of BROS Preparator, amortized over 3 year period, averaging 1,000 hours production per season, and including fuel, changing hammers (but not hammer cost) and regular

maintenance \$ 9.16 per hour
Tow tractor or grader operating cost . . . 8.40 per hour
Set of BROS ALLOY hammers(22), av.

production per set, 16 hours 29.70 per hour
Total hourly operating costs \$47.26 per hour

Cost at 150 tph production rate . . . 31.5 cents per ton

Cost at 200 tph production rate . . . 23.6 cents per ton

Cost at 250 tph production rate . . . 18.8 cents per ton

Cost at 300 tph production rate . . . 15.7 cents per ton

Production rates will vary with the type of materials and the sizes required. Production exceeding 300 tph has been very frequent. Hammer wear also varies with type of material; with but several exceptions, wear has averaged 16 or more hours production on every job. Material reduced from native over-size has sharp friction angles which contribute to resistance to displacement under traffic loads.



The Preparator is a tough, rugged machine, reducing all types of materials from limestone to blasted lava rock to acceptable subbase gradations. Your nearest BROS Dealer has the latest information on the Preparator; see him this week.



BROS Incorporated

ROAD MACHINERY DIVISION

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Write today for the full report on the Ohio tests and for complete new literature describing the new BROS SP-730 pneumatic roller. It's free of cost or obligation!



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TAMPERS



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9-TON SELF-
PROPELLED ROLLER



9 AND 13-TON
ROLLERS



LACLEDE WELDED WIRE FABRIC holds resurfacing jobs in place

St. Louis County's Brentwood Boulevard gets rugged treatment from the constant parade of cars, trucks and buses. But Laclede's welded wire fabric helps this new resurfacing job weather the barrage of wheels.

Laclede's welded wire fabric holds the resurfacing material securely . . . reinforces it against creep and surface deterioration. Even at bus stops the movement and gouging of the pavement is minimized.

CONTRACTOR:
Kelly Bros. Contracting Company
St. Louis County, Missouri

**USE THESE LACLEDE
HIGHWAY STEELS FOR
REPAIR WORK . . . AND
FOR NEW CONSTRUCTION**

welded wire fabric
welded dowel spacers
multi-rib round reinforcing bars
center joints
recess joints
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SAINT LOUIS, MISSOURI

Producers of Steel for Industry and Construction

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OLIVER

OC-15 DIESEL



"Finger-tip steering enables us to do 15% more work," says county supervisor

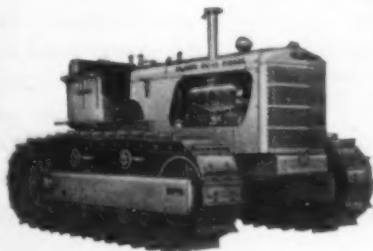
Pushing trees and stumps in soft dirt and mud is rough enough. But when you have to do it making sharp turns under full load, you'd better have an Oliver.

Clearing this right-of-way for a ditch off Route 41 near Canton, Ohio, proved it to Mack Hein, supervisor of the Stark County Maintenance Department. Here Oliver's steering accounted for a 15% increase in production over competitive equipment on the same work.

Says Mr. Hein, "We clean and clear the right-of-way at a rate of over 400 feet per hour with the OC-15. We level the banks in about the same time. All this is accomplished with the OC-15 in second gear. It's a good, fast, powerful machine. We've made no adjustments since buying it. And the initial cost is very low."

Oliver performance can cut your production costs,

too. Why not sit at the controls yourself and see the difference? Ask your Oliver distributor to demonstrate.



OLIVER OC-15 Crawler—
110 h.p. diesel. New design offers greatest power-to-weight ratio of any tractor in its class. A highly maneuverable, easy-operating tractor. Two-track turning power makes it a big producer on dozer and angleblade work.



THE OLIVER CORPORATION

Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio

a complete line of industrial wheel and crawler tractors and matched allied equipment

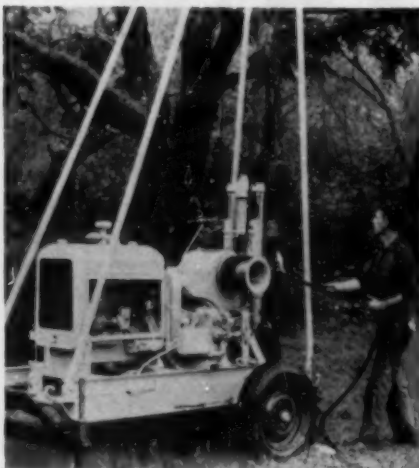
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ACKER DUAL-PURPOSE CORE DRILL AIDS FEDERAL HIGHWAY PROGRAM

Acker gives you more for your money because the essential accessories that you'll want and need are included right in the basic models. For instance, the dual-purpose rig shown in operation on the Penn-Can Highway is ready to operate anywhere! It's completely self-contained with its own power plant, built-in pump, cargo-type hoisting winch, full 360° operating hydraulic feed head and dozens of other useful features. This particular derrick equipped rig was designed to operate from the trailer, or slid-off and used on its skid base.

If you have a drilling or soil sampling problem write us today. There's no obligation. Or, if you want information and prices on the equipment featured in this ad, write for Bulletin 30. R & S.

Do you have the latest Acker Drill Supplies Catalog 58? If you drill, you'll want Acker Catalog 58. It's free for the asking!



ACKER DRILL CO., Inc.

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An ARROW MOBILE HYDRAULIC HAMMER working on a Dayton, Ohio, street, breaking street, gutters and curbing.

time and money on other jobs, too, such as cutting asphalt—tamping backfill—driving posts or piling. If you have any of these jobs to do now, here's a tip, ask to see what an ARROW MOBILE HYDRAULIC HAMMER can do on YOUR job.

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READY-MIX

(Continued from page 44)

Illinois—J. D. Lindsay, Engineer of Materials: We are of the opinion that the use of transit mixed concrete in major pavement construction has gained but little headway. A large part of the 15.4 percent shown represents pavement widening. We do not feel that "the bars have been let down" in any respect. Transit mixed concrete is still required to meet the same standards as job mixed concrete.

The special problems of inspection and testing have not changed materially. It is still found necessary to inspect all materials passing through the plants during deliveries of concrete for state work. Difficulties of control of the concrete mixtures, with respect to consistency, mixing speed, time of haul, etc., are still serious, and practically no control can economically be exercised for small and intermittent deliveries of concrete.

Construction Wages Rise

The Bureau of National Affairs, after surveying 37 settlements made with the unions in the construction industry in the first quarter of 1958, reports that 70 percent of these provide for hourly increases of 15 cents or more. Nineteen percent are in the bracket between 13 and 15 cents per hour. In all other industry, there were 712 settlements but only 14 percent of these had wage increases of 15 cents or more and only 9 percent were in the 13 to 15 percent category.

While the majority of the construction industry settlements were in the building construction field, this clearly indicates a trend for all construction which might be affected by union contracts.

Kentucky Offers Scholarships in Civil Engineering

Thirty student-employee scholarships were awarded this past year to freshmen entering Kentucky College of Engineering, under a program of the state highway department. This is a doubling of the number of such scholarships.

The plan of bringing young men into highway engineering by this means was developed by Dr. D. V. Terrell, retired dean of engineering of the school in cooperation with Dwight H. Bray, chief state highway engineer.



Lima Type 44-T Truck Crane setting concrete forms for overpass at Fort Washington Interchange of Pennsylvania Turnpike. Machine is owned and operated by F. A. Canuso & Sons, Philadelphia, Pa.

The LIMA Type 44-T... "a quality crane in every respect"

says F. A. Canuso & Sons, Inc.

"I've always had a high regard for Limas," says Julian Canuso of F. A. Canuso & Sons, Philadelphia contractors, "because of their fine design and rugged construction. We've had our Lima Type 44-T Truck Crane for 2 years now, and it has proved to be a quality crane in every respect. It's been kept busy during the past few months on this Turnpike job, mostly working on soft terrain, and we like the way it can get around and handle the heavy loads. Our experience with a real 'old-timer' will give you an idea why we think Limas have what it takes. About 5 years ago we bought a Lima Type 601 that had been working in the hard coal region for 10 years. To bring it up to date, we installed a new diesel engine, and we expect to get many more years of service

from it. You just don't seem to be able to wear it out."

Mobile, rubber-mounted Limas are available on 6 x 4, 6 x 6, 8 x 4, and 8 x 6 carriers with capacities up to 70 tons; they will go anywhere a truck will go with speeds up to 25 mph. If mobility is not a factor in your operation, you can get crawler-mounted Limas that will handle loads up to 110 tons. And readily interchangeable front end attachments—shovel, dragline and pullshovel—give Limas the versatility you need for any of your heavy lifting and digging jobs.

Your nearby Lima distributor will be glad to give you the whole story on Lima quality. Get in touch with him today or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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"A plenty tough job so we called on Caterpillar equipment for this one"



South of Camarillo, Calif., J. E. Haddock, Ltd., is relocating and improving 5 miles of U.S. 101. Some 1½ million cu. yd. of rock are being moved, 7,000 cu. yd. on an average day. Three Caterpillar DW21-Athey PR21 rigs help, carrying 18 cu. yd. apiece. The round trip is a mile, including a 12% grade.

"This job is plenty tough," says Neal E. Saul, project superintendent, "so we called on Caterpillar equipment for this one. Caterpillar gives us satisfactory service with a minimum of down time."

Now Athey PR21 Rear Dump Trailers are powered by new Cat DW21 (Series D) Tractors. They feature new Super-Turbo Engines that provide 320 HP (maximum output) and twice as much torque rise as before! Results: faster cycles, greater production —for you.

Other features, as articulated design and non-stop 90° turns in 33½-ft. diameter, let the DW21-PR21 maneuver in crowded, cramped quarters. Three-stage, double-acting hydraulic rams, 60° tilt and

straight body interior permit fast, clean dumping. The PR21 is 14 ft. 1 in. long, 9 ft. wide, allowing fast, easy shovel loading. Below are other Athey trailers suited to construction work.

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Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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"PR" Series — rear dump. Available for the DW21 (above), DW20 (34-ton cap., 23-second dump), DW15 (22-ton cap., speeds to 37.2 MPH, 13-second dump).



"PD" Series — side dump. Available for the DW20 (30-ton cap.) and DW15 (20-ton cap.). Both have 70° dumping angle and can dump on the run.

ROADS AND STREETS

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More Productive . . .

ROCK DRILLS

FOR THE HIGHWAY CONTRACTOR

The contractor has a wider selection of types and sizes today, with many mechanical improvements. The trend is toward larger and more productive drills, but the problem of choice involves many factors. Some of these factors are here discussed, followed by notes and pictures of larger drills seen on recent road jobs.

By Harold J. McKeever, Editor-in-Chief of ROADS AND STREETS

THE HIGHWAY CONTRACTOR today is moving much larger yardages of rock than yesteryear, reflecting the great advance in road design standards. This trend is not yet ended. Interstate projects in particular are destined to require removal of hundreds of millions of cubic yards of rock in regions of rough terrain.

For this new phase in roadbuilding, the contractor is ready, thanks to the availability of a wide array of greatly improved equipment. Much has been said of the mechanical revolution that has taken place—and is still going on—in tractors, scrapers, and other heavy equipment. This report puts the spotlight briefly on a paralleling development—the new, larger and more productive drills seen recently on road jobs around the country. This won't be a catalog, nor will it be a technical

handbook. But it should serve to throw into fresh perspective the fact that highway contractors are not just moving more rock than ever before, but doing it with relatively low labor cost and low over-all cost, considering the general inflationary price trend.

In this work, the choice of the right size as well as type of equipment has become increasingly important. As in moving scraper dirt, economic considerations have forced the contractor to put more horsepower at the command of each worker, and to seek the utmost in mobility, maneuverability and adaptability of his equipment.

The contractor has five broad categories of equipment for drilling blast holes that are widely applicable to highway work. These are, in general



● Track-mounted drills have largely supplanted wagon drills as the contractor's "standard" blast hole tool for highway work. (Roads and Streets staff photo—Geo. M. Brewster & Son, Inc., project, Route 17, New York).



● For larger rock quantities involving large deep cuts, drills of this size have begun to find a place. Shown here is a Joy 58-BH Heavyweight Champion drill, a completely self-contained unit using percussion bits in 6¼ to 9 in. size. Ralph Myers Contracting Corporation, Route 7, eastern Ohio—see accompanying article.

order of size, (1) the hand-held drill or jackhammer; (2) the wagon drill; (3) the crawler-mounted drill with separate compressor; (4) the tractor-mounted or truck-mounted drill with mounted-on compressor; and (5) the large self-contained drill rig complete with engine, compressor equipment on board and its own mobile mounting.

The larger drills (4) and (5) actually represent two categories,

percussion and rotary, as will be discussed.

● *Hand-held drills* or jackhammers remain one of the basic tools which the well equipped contractor must keep in stock for his anticipated work needs. These drills are needed for plugging boulders, scaling cut faces, breaking out old pavement or masonry, pioneering steep locations, ditch and trench work, and so on.

Drills are available in several

sizes; from the 14-lb. utility hammer for work where light weight is needed for safety and handling ease, such as when working from scaffolding, or in small miscellaneous work, to 70-lb. hammers which can make footages to 20 ft. depth on down-hole work in hard rock. Introduction of an improved shock absorbing handle is cited by one maker as a means of using the bigger and heavier hand-held drills without excessive operator fatigue.

The hand-held drill continues to be indispensable in built-up areas where large blasts are not permitted, where larger equipment cannot be brought in to handle the broken rock, and where small fragmentation is also essential. Hand-held drills carry small bits (1½ to 2 in. usually, sometimes larger for specially soft material), and use ⅞ in. to 1 in. steel. The adage "there's no purpose in a big hole if you can't load it for a big shot," applies



● A smaller type unit—the Le Roi Dual Drill rig, consisting of two T-286 drills on hydraulic booms, as seen on a road job in Ontario. Takes bits up to 2¼ in. Can often drill several holes from one tractor position.

most commonly to work where jack-hammers are the answer.

"We'll always use hand-held drills (and sometimes wagon drills) for small areas with low lifts of 2 to 12 ft., such as in local shallow cuts, ditching, etc.," one experienced foreman sums it up. Also: "You cannot use powder efficiently in larger holes unless it is a deeper hole as well," which is another way of explaining why the smaller drill is still essential for miscellaneous urbanized project work.

● *Wagon drills* with their air winches for maneuvering, improved feed motors, hydraulic cylinders for positioning of masts, and other mechanical refinements, are still preferred by many contractors for a wide range of work. Rock bit sizes range from 1 3/4 in. up to 3 in. and some models can be adapted for rotary or auger type bits, although percussion drilling is still the wagon drill's forte.

Wagon drills, like hand-held drills, are favored in built-up localities, where, other things being equal, a larger drill might otherwise be employed. But there is a strong continuing preference for this type drill for miscellaneous work in all areas, where a small hole pattern and use of single-piece steel give the best results. Wagon drills work best in footages under 20 ft., although holes to 24 or occasionally up to 30 ft. can be drilled. The 1 1/4-in. round drill steel usually employed limits hole depth however.

A wagon drill takes 275 to 300 cfm of air and is often paired with a 315 cfm compressor, or two drills to a 600 compressor.

Drill patterns with wagon drills are usually in the range of 3 x 3, 3 x 4 and up to 4 x 5 ft. While tables of per-hour hole footage are not feasible, due to the many factors affecting drilling speed, the wagon drill in general is expected to put down from 200 to 400 ft. of hole per 9-hour shift. In very hard

granite the footage can be less than 200 even with carbide-insert bits which require fewer bit changes. Footage is also reduced in soft, mud pocketed or broken rock where material keeps falling in back of the bit. Conversely, the wagon drill may hit soft shale or rotted stone and bore 800 ft. or more of hole per day.

The limitation factors in hole depth for wagon drills are most often the weight of the long drill rod and the difficulty of handling long lengths in and out of the hole. The 1 1/4-in. round drill steel weighs nearly 4 lb. per ft. A 30-ft. rod is not only a major load but is as limber as a piece of spaghetti when you can only hold onto the bottom 6 ft.

Steel mills normally roll rods in 20 to 23 ft. lengths and longer steels are special and more expensive. Breakage of the long rod becomes a high cost item even when the shorter lengths can be reworked and used.

A standard steel increment in wagon drilling is still 6 ft. although manufacturers have standardized on 8 ft. feeds.

The job factor to use in estimating the productivity of a wagon drill may range from 85 percent (50 minutes production per hour) on a level working floor, to as low as 50 percent on rocky hillsides, or where the rig must be maneuvered frequently over longer distances.

In short, a good hole production per work-shift with a wagon drill may be 1,000 cu yd. of ledge rock for average conditions—plus or minus 500 cu. yd. "depending." The contractor will usually need three wagon drills on a good floor to keep ahead of his 2 or 2 1/2-yd. shovel, or twice that number of drills if the drillers work days and the shovel runs two shifts. In very hard rock, as seen on turnpike work during the postwar years, as many as six or eight wagon drills per shovel were found necessary to do the necessary pioneering and

keep shovels working.

● *Crawler-Mounted Drills.* The most important single postwar advance in highway rock drilling is unquestionably the heavier track-mounted drill. Representing an evolutionary step upward from the wagon drill, this type of drill is a complete redesign for greater mobility, maneuverability and productive capacity.

Track-mounted drills with 3 to 3 1/2 in. percussion bits gave their first large-scale job demonstration on the West Virginia turnpike in 1952. Since then their use has spread until today this type is the new "standard" unit for general utility drilling on heavier road jobs.

A drill of this class may have either a steel or rubber-shod crawler mounting. Air motor propulsion and air for blowing out holes come from a separate compressor which it can tow along. The machines are highly maneuverable over rough ground and from hole to hole. Hydraulic power is used to speed the set-up control boom angle in some models, speed the operating control generally. All these features result in greatly increased productivity.

Possibly the features which have contributed most to the popularity of the heavier track-mounted drill are (1) the use of sectional carburized drill steel and tungsten-carbide bits which do not loosen gauge, to sink holes to greater depth without withdrawing or changing the bit; (2) the application of greater power to produce larger diameter holes; and (3) (according to one manufacturer) improved hole cleaning through use of ring seal shanks.

The typical crawler-mounted drill today is fitted with percussion bits ranging from 2 1/2 in. to 4 in. size for average rock. Percussion bits may be as large as 4 1/2 in. under some conditions. Many models are also adaptable to use as a

The Rock Drill Affects Over-All Job Costs

Normally the cost of drilling and blasting is not as large as the cost of shovel and wagon work which follows. But as noted in a bulletin from Winter-Weiss Company (Portadrill), "The effectiveness of the blast hole drill contributes to lower cost operation far in excess of its primary function. Its ability to stay ahead of loading equipment becomes extremely important. The drill must combine econ-

omy with dependability, or the entire operation will be delayed—time and profit lost."

The costly shovel-wagon operation can be made more efficient by skillful choice of size, spacing, depth and charging of blast holes. This teamwork when it brings good fragmentation with little or no secondary blasting helps the shovel maintain a faster cycle, the Winter-Weiss Co. also points out.



- Worthington Port-A-Trac self-propelled drill on an Ohio project. Showing adaption of this type machine to shallow holes and smaller bits, this unit drilled as many as 240 holes 4 ft. deep per 8-hour day.



- Ingersoll-Rand Crawl I-R self-propelled drill with hydraulically controlled boom and other time saving features, seen towing its air source, a Gyro-Flo 600 compressor.



- Chicago Pneumatic crawler-mounted drill on an eastern highway job. Machines like this multiply the productivity of each worker, cut rock-drilling costs where the machine is right for the job.

- Thor Rocket, a self-propelled, crawler-mounted drilling rig is shown drilling for road stone near Balsam Lake, Wis. It illustrates the adaptability of latest models to various angle drilling.



- Mayhew "Hurricane" rotary mounted on a new tractor (Cat D7) which Nello L. Teer Company, contractors, sent to the factory for assembly, for a road job in West Virginia. Gardner-Denver 325 compressor, blower, dust collector and drill all take power from the tractor engine (drill power direct take-off from transmission). 800 ft. per 10-hour day of 20-ft. holes, working in sandstone and shale with a 4 1/4 in. bit.

Track-Mounted Drills

Now Handling a Big Yardage on Rock Blasting

rotary rig with bits up to 5 1/2 in. in softer material.

Using around 450 cfm of air capacity—or 50 percent more than a wagon drill—this drill is able to manufacture blast holes that can carry much greater explosive loads. By sinking 200 to 400 ft. of larger-diameter hole per shift it often produces 2 to 3 times as much shovel rock per shift as a wagon drill working under the same conditions.

This higher productivity is more the result of larger capacity holes and wider spacing than of more rapid penetration.

Holes up to 40 ft. are easily handled with the larger improved bits, sectional steel and greater drilling power. Holes as deep as 100 ft. are feasible under some conditions, although this is beyond the range of work for which this class of machine is best suited as a routine.

A crawler-type drill teams with a 600 cfm compressor; or two work well with a 900 cfm compressor,

Handy Table of Cubic Yards Displaced Per Foot Hole Depth

Average Burden (ft.)	Spacing of Boreholes (ft.)														
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
3	0.33	0.44	0.55												
4	0.44	0.59	0.74	0.89											
5	0.55	0.74	0.92	1.11	1.29										
6		0.89	1.11	1.33	1.55	1.77	2.0	2.22	2.44	2.65					
7			1.29	1.55	1.81	2.0	2.33	2.7	2.85	3.11					
8				1.77	2.0	2.37	2.65	2.96	3.26	3.55					
9				2.0	2.33	2.65	3.0	3.33	3.66	4.0					
10				2.22	2.7	2.96	3.33	3.7	4.1	4.44	4.81	5.18	5.55	5.92	
11						3.26	3.66	4.1	4.48	4.88	5.3	5.7	6.11	6.52	
12							4.0	4.44	4.88	5.33	5.77	6.22	6.66	7.11	
13								4.81	5.3	5.77	6.26	6.74	7.22	7.70	
14								5.18	5.7	6.22	6.74	7.26	7.77	8.30	
15								5.55	6.11	6.66	7.22	7.77	8.33	8.88	
16										7.11	7.70	8.30	8.88	9.48	
17										7.55	8.18	8.81	9.41	10.07	
18										8.0	8.66	9.33	10.0	10.66	
19											9.15	9.85	10.55	11.3	
20											9.63	10.37	11.11	11.85	
21													11.66	12.44	
22													12.22	13.03	
23													12.78	13.63	
24													13.33	14.22	
25													13.88	14.81	

such as is now seen with increasing frequency. Three drills can go with two 600s with a single manifold, but this is somewhat low on air supply; two 600s plus a 900 or the equivalent are needed. Whatever the arrangement, the larger units with their greater maneuverability have stepped up the hours of actual drilling time per day, and have cut labor costs per foot of hole. The larger holes with deeper lifts have permitted more economical and efficient blasting in open conditions.

The quick rise in popularity of some of the larger drills—particularly the crawler-mounted drills with separate compressors—is due, in short, to no one factor but to all of them combined. One manufacturer puts it this way:

"For example, the development of tungsten carbide rock bits was necessary before long hole drilling with sectional rods and couplings could be widely adopted. The tungsten carbide bits retain both their cutting edge and their gauge, and thus permit the drilling of deeper holes, without changing the bit, and permit using sectional rod and couplings, heavier rock drills, and the heavier crawler-mounted units."

Another aspect of the changing rock drilling picture, notes this spokesman, is the use of the low-cost flowing explosives which are mixed in the field. The whole subject of explosives in fact is closely tied in with advances in rock drill-

ing equipment. The development of these elements of the string—the tungsten carbide bit, the 4½ to 5½ in. (hammer diameter) percussion drills, sturdy crawler-mounted wagons, and better sectional rods and couplings—all of these have made it economically possible to drill larger size blast holes. The resulting 4 and 6 in. holes make feasible the use of the pouring explosives in place of cartridge explosives.

This combination today puts the crawler-mounted drill in a strong competitive advantage for quite larger operations on highway work. The important thing, from the contractors' point of view, is that all of the equipment works together to make available to him rock drilling procedures and techniques which were not practical 5 or 10 years ago.

● *Tractor- or Truck-Mounted Rigs.* Highway contractors have long experimented with special mountings for drill and compressor. And today a number of the manufacturers have developed factory adaptations of their drills for such mountings, or offer a complete factory-assembled drill package. Distributor organizations also have been active in developing special adaptations, often embodying a tractor or truck supplied by the contractor.

Larger crawler tractors as mountings have proved efficient where the drill must climb over steep, rough ground. With most such rigs the

compressor is powered by the tractor motor, and hence the size of the drill is limited by the size of the tractor. A typical arrangement may consist of a Cat D7 or equivalent tractor with a 365 cfm compressor (or a D8 or equivalent tractor with a 600 cfm compressor). Such assemblies often carry either one track-drill type unit (3 to 4½ in. percussion bit) or two wagon-drill type units (1¼ to 2½ in. bits).

The drill may be mounted either directly on one end of the tractor or on a hydraulically controlled swiveling boom. With two boom drills, two holes (smaller in diameter however) are put down simultaneously thus cutting down the number of moves and therefore adding to the productive drilling time. Boom-mounted drills also have the advantage of being able to reach into ditches or inaccessible pockets where another type of drill could not go.

A smaller, highly mobile family of self-propelled drill units is growing in popularity. One model consists of one or two smaller directly framed or boom-mounted drills operating from a small rubber-tired tractor chassis, which carries a 125 cfm compressor.

One manufacturer in this category has developed a dual-drill rig mounted on a small 28 hp crawler-tractor. Drills work on swiveling arms, permitting drilling two 2¾ in. holes at once on any size pattern.



Crawler Tractor Mountings Are Gaining in Favor

- Why drill one hole at a time? One popular answer is this "monster". Seen on Lane Construction Corporation's Thruway job last year, it consists of a pair of Ingersoll-Rand Hydra-Boom drills mounted with X71-WD drifters and feeds. The Allis-Chalmers HD-20 tractor also carries a Gyro-Flo 600 compressor, and a dust collector as required by New York state law.



- Sometimes a smaller drill is wanted on a crawler tractor. This one, mounted on an adapted dozer frame, was used during 1957 by a Nevada contractor for ditch and minor out-crop work on a project which also utilized several heavier drills.

Truck mountings for drills are less often seen, but where conditions are right they have proven profitable for the contractor who roams over an area to do a season's work. The truck-mounted unit is fine for over-the-road travel between jobs, but its use requires a clean, level working floor.

Whether the special mounting is a tractor or a truck, some contractors have used older equipment for this purpose, in the belief that a tractor no longer good enough to



- Example of twin drills of 2½ in. bit size, hydraulically powered job so that all feed movements are automatic.

bulldoze is still plenty good enough for a drill rig. Other contractors will tell you that it pays to put a first-class machine to this service. A drill is one of the key production units and breakdowns during working hours are always costly.

- *Self-Contained Larger Drills.* Topping out the picture in drill sizes are the machines specially designed for quarries. For example, one such diesel-powered model on the market, weighing 15-17 tons, is designed primarily for "down-the-hole" percussion drilling, using 6 to 6½ in. bits for holes from 20 ft. up to 125 ft. Or it can use 4 in. "out-of-hole" bits for holes up to

60 ft.; or adapt to rotary drilling in softer rock using bits of 6 to 6¾ in. size.

This machine can be purchased for mounting on a 10 or 12 ton truck or a heavy tractor, if the self-contained mounting is not desired. In any case it utilizes a 600 cfm compressor for the air feed. Its production will range from 100 ft. of hole per day in extremely hard silicious rock up to 450 ft. in softer rock. With typical hole patterns of 10 x 12 ft. or 12 x 14 ft. or larger, the daily yield is often that of 3 to 5 wagon drills.

Then there is the still larger "big quarry" drill, also designed as special units from the self-propelling

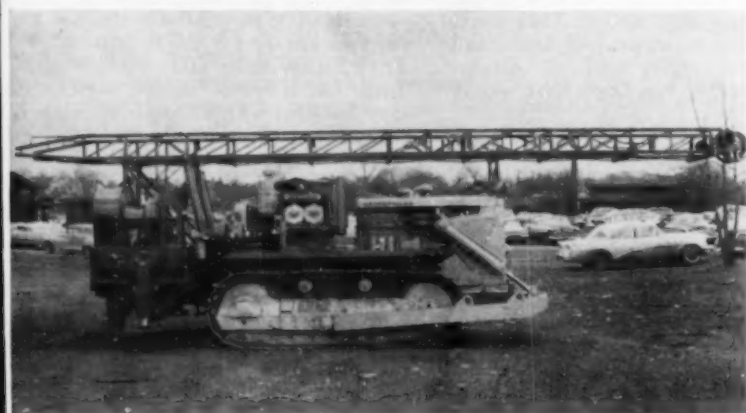


● Pair of drills on a heavy tractor, with compressor, dust collector and its own engine also on board. Geo. M. Brewster, Route 17, New York (see text).

- Still another combination—an International TD-24 tractor carrying a Joy TM-500 Challenger drill and Chicago-Pneumatic 600 compressor. Photo snapped on 143,000 cu. yd. job involving cut containing 43,000 cu. yd. of rock.



- Contractor-assembled rig, seen on Texas road job of Dean Word, contractor, includes a 1939 renovated Cat D8 tractor. Drilled 3-in. holes 42 ft. deep in tough limestone, reportedly making 60 ft. per hour.



● Davey rotary unit on a Cat D7 tractor, boom down and ready to travel over the job.



tracks on up.

One such commercial unit utilizes 1,200 cfm of air (two "600" compressors mounted on) and can employ either rotary (cone) type bits from 6 to 7 $\frac{3}{8}$ in. or down-the-hole drilling with 7 to 9 in. bits.

Another maker offers a 42-ton diesel or electric powered rotary drill for 6 $\frac{3}{4}$ to 9 in. diameter holes, using 685 cfm of air; and a still bigger rotary machine for 9 $\frac{7}{8}$, 10 $\frac{5}{8}$ or 12 $\frac{1}{4}$ in. holes. This top size unit which needs very large scale operation to justify its use, has reportedly averaged 125 ft. per hour of 10 $\frac{5}{8}$ in. hole in medium sandstone and hard shale. This and the lesser giants among the drills are more

likely to be found producing highway aggregate than on grading.

But with the big million-yard-plus projects in the wind, who is to say where the contractor will find the 6 in. and larger drills economical?

● *Percussion or Rotary?* For drilling blast holes in sizes above about 4 or 5 in. diameter, the choice of a percussion or rotary type drill may require some comparative study.

Where the rock is very hard, percussion type drills are economic for a range of sizes sometimes up to about 7 in.

But in soft or easy drilling ma-

terial, the rotary type drill becomes an economic contender beginning with perhaps 4 $\frac{1}{2}$ in. or 5 in. bit size and on up. Wagon drills, as a matter of fact, are often adapted to rotary drilling of holes in this lower range, the holes thus produced usually being larger than those ordinarily drilled by percussion in harder rock with the same machine.

In the 8 to 12 in. range, the rotary type is standard. Here, as in all aspects of rock drilling, practical experience is "king." No part of the roadbuilding job calls for greater exercise of judgment in equipment selection and day-to-day use than the drilling of blast holes

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● Bucyrus-Erie Model 40-R rotary (at right, in distance)—another example of large quarry-type equipment seen on highway rock work. Isbell Construction Co.; U.S. 40, Nevada. Trailer in foreground houses generator for 5-yd. Bucyrus-Erie electric shovel.

for grading and aggregate production.

A reminder of the great variation in job conditions as well as the “personal equation” among individual contractors, is seen in the following field notes. They cover a typical assortment of 1957 road projects which utilized various types of drill rigs larger than wagon drills.

New York Thruway—Lane Construction Corporation

Project: A 7-mile segment of the Berkshire link of the New York Thruway, near the Massachusetts line; 1957 season.

Rock Excavation: Over a million cubic yards, with several large continuous cuts and various smaller cuts in rolling terrain.

Equipment: Working with four shovel outfits, the contractor utilized an Ingersoll-Rand Quarrymaster and two “monster” units (locally called) each consisting of an HD-20 Allis-Chalmers tractor carrying two I-R drill units mounted on hydraulic boom swiveling arms. (Both units pictured).

The Quarrymaster, used in the largest cuts, is a self-propelling, self-contained unit. Working usually with a 7-in. I-R Carset bit, it drilled here with a down-the-hole hammer. The machine's two 415 cfm compressors supplied air for blowing holes. (Compressors also supply an air motor for turning a 6¼ in. cone-type rotary bit when this type of bit is preferred). Holes for a 20-ft. cut were drilled on a 16 x 16 ft. pattern. Blasted rock was loaded with a 3½-yd. Lima or equivalent shovel.

One of the tractor-mounted “monster” machines seen in action was working on the west-bound roadway immediately across the

wide median from the Quarrymaster, and in shallower ground. Utilizing air from an Ingersoll-Rand 600 cfm Gyro-Flo compressor on the tractor, the two drills with 2½ in. bits were putting down holes through shale in relatively shallow cut location on a 5 x 5 ft. pattern. The shallow holes and easy going made for frequent moves, which were handled with dispatch by this equipment.

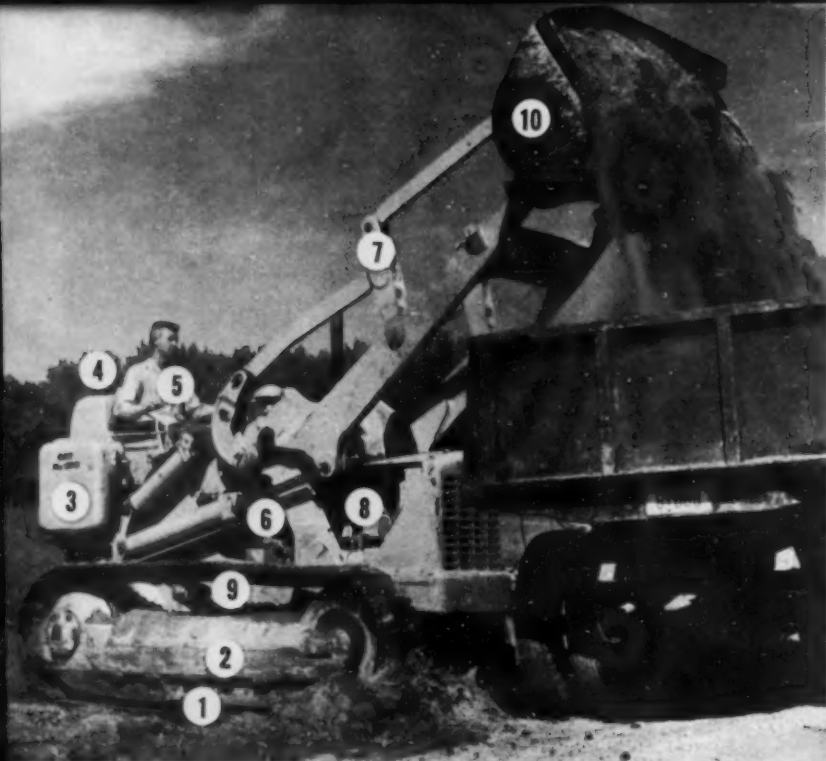
These two types of drilling outfits, working often nearly opposite each other on dual roadways, illustrate the selection of equipment to the various job conditions.

Route 17, New York—Geo. M. Brewster & Son, Inc.

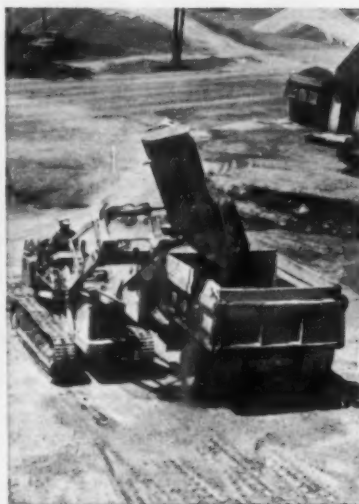
Project: 8 miles of dual expressway on new location near Ellenville, N. Y., awarded in 1956 and graded largely by early 1957. De-

● Davey truck-mounted rotary drill sinking large-diameter holes for deep cut shelf—Ohio route 7—see accompanying notes.





Caterpillar No. 955 Traxcavator works 10 hr. a day loading sandy loam into 6-yd. trucks for Brookings Excavating Co., Brookings, S. D. Two blocks of a street on the outskirts of town are being widened. Traxcavator is leveling bank. "One of the features we like best about it," says owner Lyle Stewart, "is the 40-degree tilt-back. It's especially useful tearing up old roads and sidewalks. You can get the bucket under a slab and use the tilt-back to tear up larger slabs at a time." This No. 955 is used for backfilling, too, and for digging basements, as well as for finish grading.



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- 5 Learn how convenient the *one-hand lift and bucket control levers* are.
- 6 Start the *all-weather gasoline starting engine*—so easy from the operator's seat.
- 7 Examine the *lift and bucket control arm linkage*—permits 40° tilt-back at ground level.
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- 9 Hear the amazing economy and convenience facts behind the *exclusive oil clutch*.
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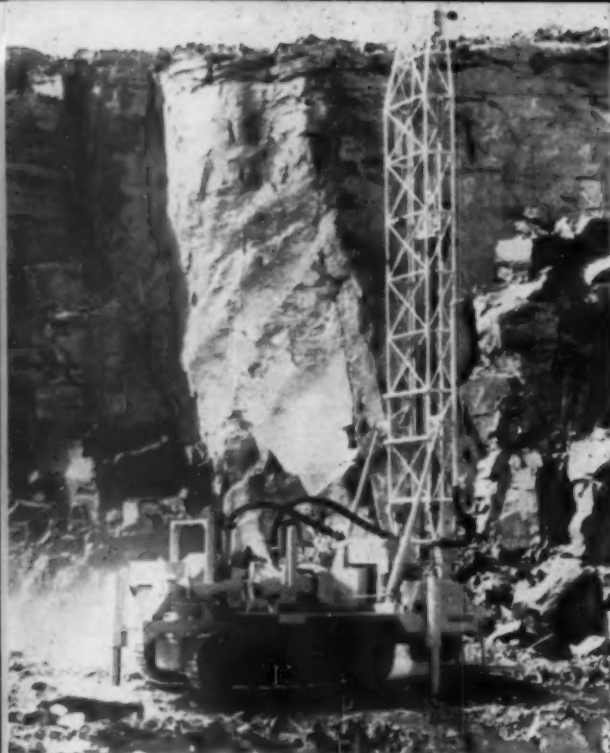
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- One of the largest crawler-mounted drill packages is the Winter-Weiss Portadrill unit here pictured on a western job. Mounted on an Eimco tractor, this Model 105TA drill can take bits up to 9 in.



- Failing assembly, consisting of a drill unit mounted on a GF-660 Crane Carrier truck, with Gardner-Denver Mole Drill for 6½-in. diameter holes. Oklahoma location. A GM Detroit 4-71 diesel powers the compressor, the truck engine operates the rotary table.

signed to Interstate standards.

Rock Excavation: Over 3,000,000 cu. yd. of unclassified excavation, with a high percentage of rock or shale. One shale through-cut was 700,000 cu. yd., with depth up to

80 ft. over a wide area.

Equipment: The large and varied equipment fleet included several units of note:

(1) Several Gardner-Denver Air Trac drills, with crawlers and self-

propulsion. (See picture). These utilized 3½ in. Timken and Kennametal hard-rock bits and various regular bits—typical of such equipment seen on many of the road jobs

(Continued on page 91)



What Size and Spacing of Blast Holes?

This is one of the "ifst" matters in the whole realm of highway construction. Nowhere is practical judgment and experience so much needed, due to the many variables of rock conditions and job circumstances. Since this is true, and since highway work conditions vary widely from station to station, the demand is for versatility in equipment.

Larger hole sizes have been employed recently, particularly in the west, as part of the use of larger loading and hauling equipment, but also with the motive of being able to utilize the cheaper grades of explosive, such as ammonium nitrate bagged fertilizer. This explosive agent is best adapted to holes of 6 in. diameter or larger, specially for deeper holes, although some experimenting is being done with the fertilizer in smaller holes.

- Lane Construction Corporation, of Meriden, Conn., used this Ingersoll-Rand Quarrymaster on large continuous cuts on a New York Thruway project—see accompanying notes.

New Problems Popping

Up on Every Phase of—

Freeway Operation and Maintenance

Notes on the first of several regional seminars on this timely subject being held by the Institute of Traffic Engineers.

Roads and Streets Staff Report

At a two-and-a-half day meeting in Columbus, Ohio, recently, questions flew thick and fast on a subject that represents a whole new world of highway technology—one that was born only yesterday, and which already is a lusty, squalling infant indeed. The meeting was the first of a series of regional ones held by the Institute of Traffic Engineers. Among the scores of questions covered at the Columbus Seminar are such as these:

Who is going to give the motorist the custodial "super-service" on the Interstate freeways that he has come to expect from patronizing toll roads?

What can the engineers do to anticipate and minimize congestion at points of access between expressways and approach streets?

Along urban expressways, when should there be flanking service roads?

How far should state highway departments or city officials go in providing for garage service, fire trucks, ambulances and other emergency facilities for motorists using free expressways?

What is the latest thinking in Interchange highway design—i.e., the nature and location of directional signs, lighting, and geometrics generally—as it affects the on-coming motorist's ability to make decisions in time to act with safety?

How much will it cost per mile to maintain the new freeways planned for the Interstate System? And what modification of design and construction details are necessary to keep maintenance down?

What kind of cooperative effort is needed within the roadbuilding agency, as well as between the agen-

cy and community groups, to plan out the operational and upkeep phases of expressways before the planning has gone too far?

What new research is needed in driver behavior patterns on high-speed express facilities?

The Columbus meeting and those following in other parts of the country are attempting to answer such questions, or at least bring them out in front. Because these meetings represent pioneering of the greatest importance, the Editors have developed the following notes in considerable detail.

The Columbus sessions were "professed" by top men in this field, with able planning by the Institute Washington staff and by the local Institute chapter leaders. The discussions were often long and spirited. Much subject matter of necessity is omitted here. The engineer who would like to secure the full benefit of this seminar should request proceedings. Address the Institute of Traffic Engineers, 2029 K Street, N.W., Washington 6, D.C.

● *What is an Expressway?* The meeting was keynoted by D. W. Loutzenheiser, Chief, Highway Design Division, Bureau of Public Roads, Washington. He laid the ground for discussions to come by defining the term "freeway," as applying to a facility which serves through traffic (not necessarily long distance traffic, however) as its primary design purpose. The freeway's chief functional advantage lies in the continuity of flow afforded.

This speaker made the distinction between rural and city type freeways in their detailed design problems, and between radials, in-

ner and outer belts as pertaining to the urban area served.

● *Impact on Motorists.* The new freeways and their relationship to the traveling public was explored by Burton W. Marsh, Director, Traffic Engineering and Safety Department, American Automobile Association, Washington, D.C. This veteran traffic engineer noted that most motorists today are sold on freeways, which have quickly achieved popularity when well designed because they offer something better than ordinary streets. He pointed to the double function of a freeway in directly serving its adjacent neighborhood, while also primarily handling through traffic. Basically the freeway serves the land better in a broad way, superseding the property-by-property type of land service road for the general good.

The motorist has developed a "super-service" concept of the freeway, said Marsh. He expects steady 70 mph speed in rural areas and 55 mph in urban scenes. He expects clearly understandable advance warnings, big and bold directional signs, wide medians, ample lane width, good shoulders, a high type surface. "Have we oversold the motorist?" he asked, and immediately answered "No, they can have this type of road if both the planning and the operational responsibilities are properly met." The engineers will be judged by both.

The operational problems today challenge the highway agencies, Marsh continued. Freeways cut death rates, but this saving in lives is not automatic. There must be operational management, including much pioneering. "On many of the operational problems of freeways we don't yet know the answers," he said. For example, "we don't know enough about the effect of the new facility on the use and value of the adjacent land, on parking, on traf-

fic on nearby streets, on the effect on profits of business and industry." Marsh implied that a broad program of research and correlation of known data will be needed as a necessary preliminary to sound freeway planning and operation.

● *Design Problems with Freeways.* The first-day sessions included a panel of speakers on various aspects of design. O. K. Norman, Deputy Assistant Commissioner, for Research, Bureau of Public Roads, outlined some of the procedural aspects. He noted that the Bureau has no direct responsibility for operating highways, but does have a direct responsibility to Congress for the federal-aid highway program as a whole.

Normann, who is a pioneer researcher in highway capacity, discussed speed patterns as a basic problem in freeway design and operation. He noted that speeds on the nation's arterial roads have risen steadily. In prewar years the highest average was 42.5 mph, in 1940 it was 48.5 mph, in 1950 it was 55.5 mph where enforcement was practised and 64.2 mph without enforcement. Today he said that where there is neither a speed limit nor enforcement, highest speeds will average 70 mph.

On the subject of approach streets for urban freeways, Normann discussed this serious and mounting problem by suggesting that practical steps can often be taken to increase the peak capacity of such bottlenecks. For example, by certain modifications in one street, the peak capacity per hour of green light was raised from 3,000 to 6,000.

Parking control and one-way patterns are two of the chief tools for solving approach street problems, Normann reminded. There is a need for correlating the planning of freeways with surface street work, so that local street modifications will be ready when the freeway is opened.

The design problems in developing freeways, as they relate to present and anticipated land use along the routes, was discussed by E. G. Wetzel, Assistant Chief, Planning Division, Port of New York Authority. Basing his remarks chiefly on data from toll facilities of the New York region, this speaker told of the relocation of industries along the toll roads, encouraged by the convenience of travel for company personnel.

Discussion of this subject brought out various points, one of which is

the need to provide, in the initial design of interchanges, for adding more lanes to ramps to take care of future traffic growth.

Experiences in operating Detroit's expressways were related by Alger F. Malo, Director, Department of Streets and Traffic, City of Detroit. He told of a trend by truck operators to locate garages immediately off the expressway ramps. Studies have been made on various aspects of the influence of the expressways (now totaling about 16 miles) on local street and arterial traffic. Some arterials near John Lodge Expressway have seen a drop in traffic of as much as 50 percent.

Both the Lodge and the Ford Expressway have virtually continuous service roads flanking the depressed express facility. Malo recommends continuous service roads, as being important for urban freeways for emergency as well as normal functioning.

While local streets have lost traffic to the freeways, this speaker expressed the belief that surrounding streets should take some of the peak load. In discussion it was brought out that some traffic engineers are studying the problem of designing and marking ramps so as to discourage peak congestion on the expressway, by making it relatively more inviting to take the alternate parallel route.

Audience Questions

Questions from the audience at this point included the one on how to prevent excessive rise in land values before right-of-way can be acquired. Wetzel of the Port of New York Authority pointed out the provision in the 1956 Federal Highway Act which permits the highway department to acquire land as much as five years prior to construction.

Discussion also occurred on urban ramp design to minimize congestion. Normann of the Bureau observed that O-D and other studies were needed to give the answers. Very elaborate ramp and dispersal facilities are often required today. Wetzel of New York told of ramp design studies made in connection with the newly-opened third Lincoln Tunnel tube under the Hudson River. O-D studies indicated that a limited access ramp would need to be carried for ten blocks from the entrance, and two streets would require widening with extension of access control at grade.

Spacing of interchanges on urban freeways was another discussion

topic. Loutzenheiser of the Bureau emphasized the importance of ramp spacing as a design consideration. Local people, of course, want closer spacing, which tends to defeat the access control principle. The better approach, he said, usually is to make more improvements to surrounding streets.

The location of parking garages in relation to the freeway was discussed briefly by Malo of Detroit. He said that new garages in downtown Detroit have been located relatively close to freeway ramps. The long-held belief that car owners will not walk far to park is upset by experience here; motorists prefer to walk several blocks so that they can begin their car trip at the ramp, thus avoiding the surface streets.

Malo was asked how the new expressways in Detroit have influenced local street betterment programs. He said that it is too early to note any significant change, but that it is best to wait and see where the new pattern of need lies before planning too far ahead on local or surface street improvement.

● *Service to the Motorist.* The service needs of motorists patronizing freeways, both urban and intercity, was a panel subject. Speakers were Edmund R. Ricker, Traffic Engineer, New Jersey Turnpike Authority, Lt. John L. Bishop, District Commander, Ohio State Highway Patrol, and William H. Polkinghorn of the Detroit traffic police.

This session immediately revealed the need for new and pioneering ideas in a field of effort heretofore limited chiefly to toll roads. "After a while every motorist must stop to take care of personal needs," said Burton Marsh of AAA, who presided. "These needs include rest room, food, phoning, mechanical or service attention, or simply to rest. The state highway departments face many unsolved problems and policy decisions in this field."

This panel was planned to bring out an array of available data, principally from toll road operation. The number of calls for help in mechanical emergencies alone is large on the toll roads, said Marsh. In such emergencies including accidents, what service will be provided along the freeway? How will the motorist be informed of the services available, and where, and what action to take?

Particularly in rural areas this matter is still completely unsolved as the highway departments swing
(Continued on page 65)



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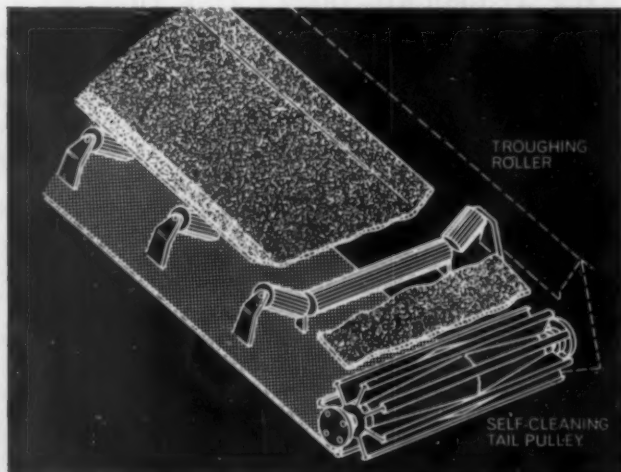
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FREEWAY OPERATION

(Continued from page 62)

into the Interstate program.

Legal obstacles to full service to motorists were cited by Marsh. Section 112 of the 1956 Federal Highway Act specifically forbids automotive establishments within the right-of-way. Motorists must leave the freeway at the interchange ramp—in contrast with the toll road—in order to get gas or for any other reason of personal need. This fact introduces many serious problems which has greatly concerned the management of the American Automobile Association in behalf of motorist members.

Panelman Edmund Ricker of the New Jersey Turnpike outlined the policies of his road. Mechanical service needs were seen to be a prime problem when the turnpike's service areas were planned. The policy has been to limit service to gas, oil and minor repairs such as new fan belts, etc.; heavier repair service would quickly set up prohibitive costs and lead to congestion at service areas.

● The turnpike today has 18 emergency service vehicles located at 14 service areas. These carry tires, gasoline, oil, batteries and light tools. Heavy maintenance found necessary in answering a call is made available through 40 garages, or about two near each interchange. These garages are supervised rigidly, and are required to have specified equipment on hand and to charge posted rates for towing and other work.

This tie-up in conjunction with intensive highway police patrolling and radio communication has kept the mechanical mishap situation under control on the Jersey Pike.

Bishop of Ohio in his panel talk pointed out that the need of the motorist is no different whether he is on a toll road or on a freeway. A post card survey of turnpike patrons shows that half of all motorists stopped at at least one service plaza while on the (240 mile) turnpike. Of these, 34 percent had food, 28 percent patronized rest rooms, 21 percent took on gas. Food was tallied oftenest for trips up to 165 miles.

The patterns of trip length for a freeway segment, he noted, will affect the planning of personal service facilities (location, frequency, character). The Ohio department of highways, incidentally, has done much advance planning on this

subject in its Interstate road program.

On the Ohio Turnpike, to continue with Bishop's data, 4.5 percent of cars have had some mechanical difficulties. Chief trouble: flat tires, motor trouble, ran out of gas. Mechanical trouble, he said—and the audience recognized this as a basic point—is a definite statistical matter that can be estimated in basic planning.

Detroit's speaker on this panel, W. H. Polkinghorn, told of the intensive patrolling done on the 16 miles of expressways now completed within the city. Two county-owned trucks patrol this system 24 hours a day, on the alert for motorists who show signs of distress or who have pulled onto the shoulders. Tire changes on shoulders are discouraged, "ruined tires being cheaper than a human life." Beginning at 3 a.m. any cars abandoned on the shoulders are towed away in readiness for the morning rush period.

The speed limit on this system, said this speaker, being 55 mph, brings out tire and mechanical weakness with vehicles that are usually driven much more slowly on local streets. Wheels wobble, cars run out of gas, and other things happen at frequent and predictable intervals, often tying traffic up for three or four miles. Much good work has been done through local publicity agencies to educate the public.

The trucking associations, too, have cooperated to lessen mishaps in this fast 100,000 per day traffic stream. Truck owners have pledged to keep trucks off the expressway entirely during rush hours.

Pamphlets on driving rules have been issued with funds from civic groups. These sheets are passed out to motorists at ramp entry points by enforcement officers.

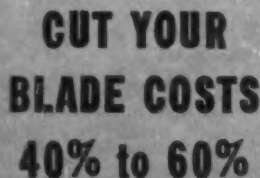
Meanwhile every car parked on the shoulder is investigated, and every stalled vehicle is quickly spotted and pushed or towed to the shoulder.

The problem of unauthorized wreckers came up in discussion. In Detroit they have had to be shooed off the expressways. Ricker of New Jersey, said that car owners are permitted to do their own repairing on shoulders, but not to leave their vehicles to seek help. Bus and truck firms have their own service facilities frequently, and are allowed to come in.

How about rest facilities, roadside parks and picnic areas, etc., along the Interstate highways? A spokesman from the Bureau of Public Roads told the audience that an AASHO and BPR policy on the subject would be made available soon. Meanwhile, Ohio engineers are planning rest areas at 25-mile intervals along the new Interstate route being built diagonally across the state, and at closer intervals on some other routes planned. The problem of driver fatigue as a factor in traffic accidents is recognized as requiring that the rest-area policy be clarified as soon as possible.

Also in Ohio the engineers recognize the "tremendous" need by motorists for making phone calls while in transit—calls to home, office, customers, for reservations, etc. Wayside stations are planned along semi-expressways. (Phone booths along some toll roads have had to be doubled and tripled in recognition of this need.)


Note: The foregoing is the first part of the Editor's notes on the ITE Freeway Operation Seminar at Columbus, Ohio. Additional notes will appear in succeeding issues.



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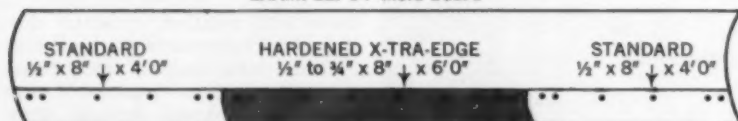
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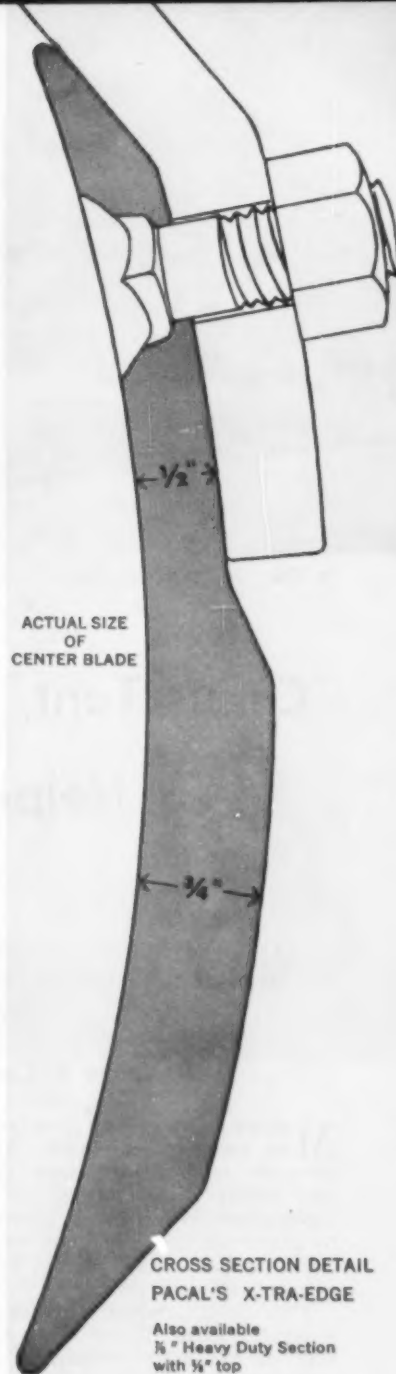


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"Circus Tent," Plastic Sheeting— Helped Bridge Contractor Defy Winter

Winter temperatures spiced by cold Lake Michigan winds didn't daunt this contractor or delay his concreting schedule.

By James R. Cummings, Assistant Editor

MODERN highway work gives birth to some strange sights. And certainly none was stranger this past winter than a bridge under construction with its flanks covered by plastic sheeting and with what could pass as a sideshow tent flapping its canvas on deck.

This bridge, which will carry Rosecrans Road Illinois route 173 over the Tri-State tollway, is located northwest of Waukegan and just south of the Wisconsin line. The bypass for Rosecrans road around the project lay under threat of washout due to local ground contours. So the contractor L. G. Arnold, Inc., of Eau Claire, Wisconsin, decided to hasten the work as much as possible. This meant doing most of the work during this past winter, with serious delays in prospect from cold and inclement weather.

The idea of the tent and plastic sheeting was then hit upon, as a means of providing curing protection and more comfortable working

conditions for the men.

The bridge is a pre-cast, pre-stressed concrete structure with a 7½-in. slab. The roadway consists of two 27-ft. lanes with 2-ft. side-walks and a 4-ft. median divider. Approach ramps are on embankment.

Work started on the bridge in October, 1957, and footings and piers were being poured the second week of January. The contractor had placed an order for a plastic covering with Lance Construction Supplies, Inc., of Chicago, and on January 9 five 100-ft. x 28 ft. wide rolls of Visqueen polyethylene film, .006 in. thick, were delivered to the site. The entire substructure formwork of the bridge was framed in and covered with the plastic sheeting to allow pouring to proceed in the weather then hovering around 32° F. or colder.

The severe storms that struck the nation during the early part of February had their effect on the toll road locale. A ten-day siege of

below-zero weather occurred during which operations on the bridge had to cease despite this protection. When the work resumed after mid-January, Louis Arnold, manager of the L. G. Arnold Company field office, realized that even with more normal seasonal temperatures, the deck pouring then at hand, would still be subjected to the chill lake winds. And he knew that work would slow down in proportion to the discomfort of the men.

Curing of the slab, too, required maintaining of definite tempera-

BEGINNING SERIES ON

Winter Methods, Problems and Progress

This article is the first of several which will discuss experiences in keeping road jobs going in winter, and of snow and ice control by the highway departments. Additional reports in August and September will include one on how the contractors operated during the 1957-58 winter along the 187-mile Illinois toll road now in the paving stage.

- Visqueen polyethylene film is tacked onto framing. Entry is provided by door at left.

ture minimums. The specifications stated that if the outside temperature were 40°, the temperature of the concrete must be maintained at 50° for at least 72 hours.

Rental of a canvas tent was arranged with the O. Henry Tent & Awning Co., of Chicago. The decision was made to cover one lane during the required pouring and curing time and then move the tent over to the other lane—thus cutting down on the size of tent needed.

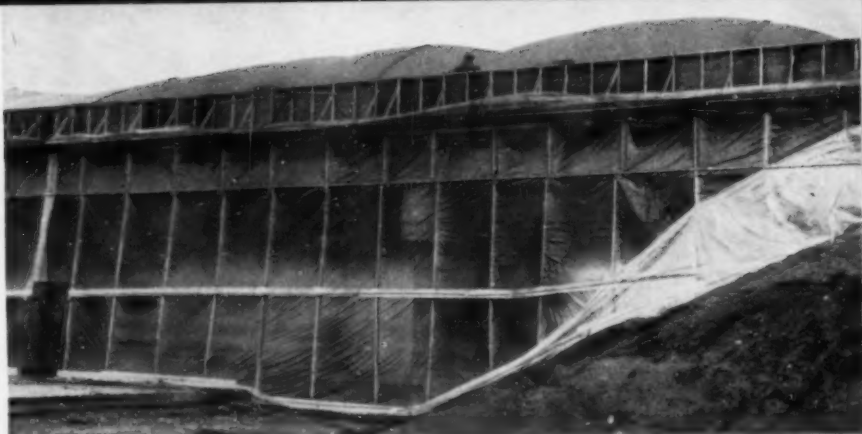
A 240 x 40 ft. tent was delivered to the bridge on February 17. It was erected in one 10-hour day by a 12-man crew including two men from the tent firm.

Each lane was scheduled for three all-day pours. The first half of the deck was poured February 26-28. The tent was left over this lane for two weeks, then was moved to the other lane for the concreting there which took place March 14, 15 and 17.

The approaches to the bridge on Rosecrans road were scheduled to be paved in May, and the bridge then opened to traffic.

- Each of the two types of enclosures provided particular advantages. The plastic sheeting shrouding the piers and abutments created a higher temperature inside, confined the extra heat generated by salamanders, and bestowed a third—and most welcome—bonus: the material being translucent, the only need for artificial lighting was on heavily overcast days.

The tent met many needs and provided few, if any, obstacles. Its major benefit of course lay in keeping the winds off the working area on the deck, and in keeping temperatures up for the concrete. The temperature inside was said to be 20° warmer, 30° when a stiff wind was blowing outside.



- This interior shot was taken by natural light alone. The plastic sheeting stood considerable wind velocities without tearing.

At the end of the bridge where the ready-mix trucks were spotted, a flap was opened in the tent and a plywood ramp laid into the interior for the concrete carts.

During working hours, some flaps along the side of the tent were let down about 3 or 4 ft. These openings, together with a single string of 100-watt lights run along the center of the tent, gave ample light for the paving opera-

tions.

One problem which had caused some initial head-scratching was met with typical contractor resourcefulness. The main center supports for the tent roof were 5-in. poles. These of necessity had to be situated right down the middle of the tent—and right down the middle of the lane being paved. Here's how this was handled:

When the poles were set up they were passed through the prestressing rods and anchored to the girders. When pouring was about to take place, the section of the pole passing through the deck area was girded with a paper cylinder used for casting test specimens. When the concrete placement had passed beyond this spot and the new slab

(Continued on page 72)



- Crew using Bell Prime Mover concrete carts and Mas vibrators in pouring slab under tent.



EIMCO 105 FRONT END SHOVEL



EIMCO 105 TRACTOR-DOZER



EIMCO 105 TRACTOR-EXCAVATOR (OVERHEAD)

"HELL FOR STOUT"

This phrase — customers (the world over) have learned from experience — is the most accurate way to describe the design and construction of Eimco Equipment.

For over three-quarters of a century Eimco has built machines for the rock loading and earth moving industries that are offered to do the tough, hard jobs. You can get a lot more for your money when you buy the Eimco Tractor-Dozer, or the Eimco Tractor-Front End Shovel, or the Eimco Tractor-Excavator (Overhead).

These are tractors that are built to do the job for which they were sold — they are not like all competitive machines — adaptations of agricultural or industrial machines.

Check these exclusive features that you get **ONLY** when you buy an Eimco:

1. Full visibility — operator sits up-front.
2. Fast maneuverability — independent track control — power shift.
3. Low center of gravity — climbs 100% grades.
4. Torque converter — elimination of master clutch, gear shifting and levers.
5. Unitized construction — fast, easy maintenance.

Why settle for less — demand the best for your equipment dollars.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kalamazoo, Mich. Pittsburgh, Pa. Seattle, Wash.
Cleveland, Ohio Houston, Tex. London, England Gothenburg, England Paris, France Milan, Italy Johannesburg, South Africa



E-315

... for more details circle 261 on enclosed return postal card

Cat No. 12 Motor Graders!



BEST BUY FOR 20 YEARS—BEST BUY TODAY!

Here's why: When the No. 12 was introduced in 1938, it set new performance standards to become the leader in this type of equipment. Today it *still* is the leader, because Caterpillar has constantly built improvements into it.

Shown here are *some* of the many changes that have been made in the No. 12 to keep it the unquestioned leader. Its exceptional dependability and high resale value are common knowledge. Dollar for dollar, the No. 12

is the most valuable motor grader that you can own.

Compare today's No. 12 with any other motor grader—compare it with older No. 12s, too. By any measure you'll find it has grown in work ability, matched to meet today's exacting construction and road maintenance needs. For complete information about this modern, heavy-duty machine, see your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

FIND YOUR CATERPILLAR DEALER IN THE

YELLOW PAGES



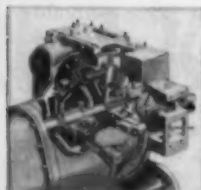
CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

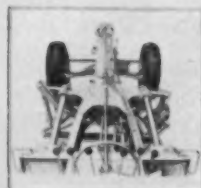
**NO. 12 MOTOR
GRADERS—BEST BUY
BY ANY YARDSTICK!**



Longer main frame adds extra clearance between the toe of the blade and the front tire for all blade positions. There's ample blade maneuvering space whether the No. 12 is equipped with 15.00-24 or 14.00-24 front tires. Curved side shift rack permits fast, easy blade positioning—all common blade positions are available to the operator without leaving the cab.



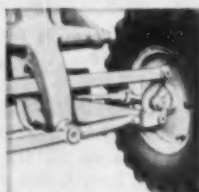
Exclusive oil clutch, the most advanced clutch design ever offered in a motor grader, provides up to 2,000 hours without adjustment. This is equivalent to about 12 months of "adjustment-free" operation. And because wear rate of clutch facings is so slight, down time for clutch repair is virtually eliminated. The oil clutch accounts for a large part of the No. 12's reputation of dependability.



Unequaled visibility results from the No. 12's dash-mounted lift gears and low frame design. While seated, the operator has an unobstructed view of the critical areas at the front wheels, toe of the blade and circle. In-cab starting and easy-to-reach controls are other No. 12 features that help the operator work more efficiently.



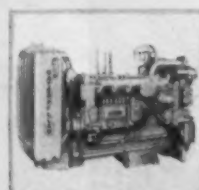
Optional Preco Automatic Blade Control, available only on Cat Motor Graders, controls blade slope to an accuracy of within $\frac{1}{4}$ " in 10', regardless of position of grader. Operator merely dials the required slope on the control, then follows the guide lines. Preco-equipped No. 12s cut conventional grading time as much as 50%.



Improved service life is built into the No. 12 with larger king pins and bushings, larger inboard spindle bearing, new steering arm pivot block with seals, improved steering booster with outboard bearing. No other motor grader can surpass the No. 12 for rugged construction—another important factor in the machine's dependability story.



Mechanical controls, standard on the No. 12, offer positive action, make blade adjustments precise. Powered right from the engine, they give a speed and range of blade movements no other unit can match. More than one lever can be operated at a time, without slowing blade movement. "Anti-creep" braking mechanism makes the blade "stay put" while under load.



Modern heavy-duty Cat No. 12 Engine features, among other advantages, the exclusive Caterpillar fuel injection system. This permits the use of economy-type fuels without fouling. The long-life reputation of Cat Diesels is well known—no other engine can match them for dependability!

... for more details circle 249 on enclosed return postal card



● Showing how the tent was set up along one side of the deck.



● 40-ft. width of tent allowed plenty of elbow room in moving men and equipment inside enclosure during pouring.

PLASTIC SHEETING

(Continued from page 69)

had set, the pole was pulled up and placed flat on the deck on a small piece of board a few feet away. The scone was removed and the hole patched.

The adaptability of the tent was described as one of its assets. The

width of this type of tenting is standardized at 40 ft. But since it comes in 40 ft. lengths, the total tent length can consist of as many of these sections as desired.

According to tent theory, says the O. Henry Tent & Awning Co., the poles hold the tent up, while the ropes at the side tie it securely in place. And continuing theory, these ropes should go down to the

ground at a 45-deg. angle from the tent sidewall. However, these rules are as flexible as a canvas flap, as was proved on the Rosecrans bridge. When it wasn't possible to tie the tent down in the proper fashion, a variety of anchorings was used. Some of the ropes were lashed to ground stakes below, some to utility poles, and in one location, an unused dump truck parked on the toll road level below was drafted as an anchor.

Managerial comment on the tent was entirely favorable. N. R. Hankins, resident engineer for Roberts & Schaefer Company, consulting engineers for this section of the Tri-State Tollway, said this was his first experience of such winter protective measures. He thought the tent gave valuable service.

Jim Grant, bridge engineer for L. G. Arnold, Inc., went further. He said that pouring of the deck could not have taken place without the tent. "We really feel these March winds up on this deck. If the men had had to work up here without cover they would have spent the day huddling around the salamanders."

George L. Jackson is chief engineer of the Illinois State Toll Highway Commission. Consulting engineer on the entire project is Joseph K. Knoerle and Associates, Inc.



● Men doing finishing work were provided with ample light by lowering sidewall sections of tent.

● A. F. CLAUS, vice president and general manager of Highway Equipment Company of Cedar Rapids, Iowa, manufacturers of spreaders and bulk delivery equipment, announces the appointment of Gale E. Allen as general sales manager, and of William Roeschen as chief engineer.

**Look ahead...*move ahead*...and stay ahead
with Allis-Chalmers**



**... the construction machinery
that keeps your production rolling**

YEARS AHEAD IN DESIGN

extra performance

unequalled dependability

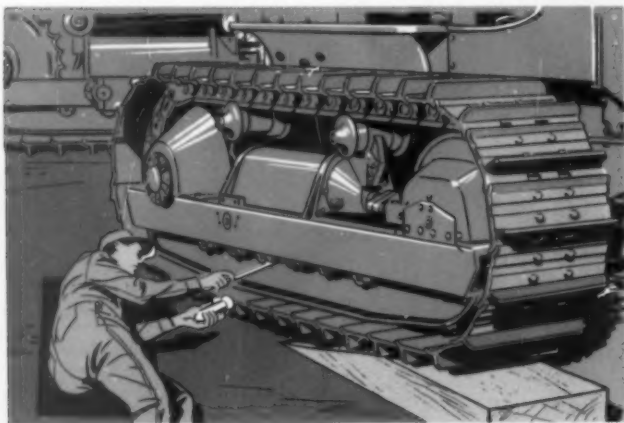
...backed by qualified dealer service



Your Allis-Chalmers Dealer is a Specialist in

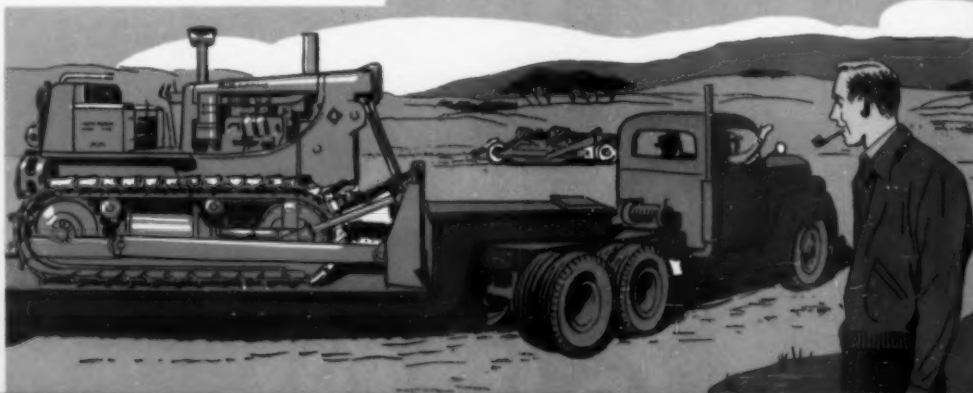
Your Allis-Chalmers dealer *knows* the equipment he sells. He can give you the expert service in shop and field that results in "like-new" performance from every Allis-Chalmers unit in your fleet . . . keeps them producing on your jobs.

Add the availability of Allis-Chalmers parts—made in the same factory, to the same rigid specifications as original equipment—and you have a program built to maintain top performance, long equipment life, low job costs for you!

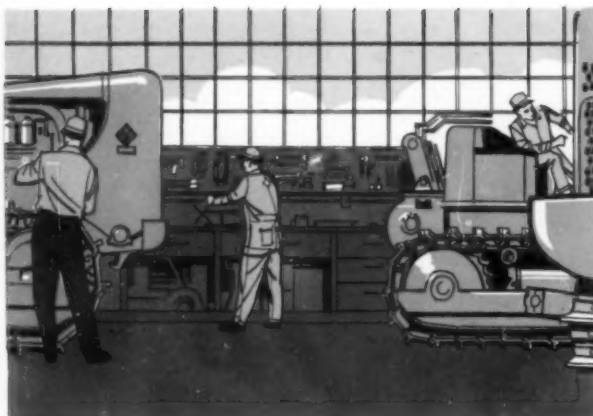


Careful pre-delivery servicing assures that Allis-Chalmers construction machines have been thoroughly rechecked . . . and that they're ready for work as soon as you get them.

Detailed information on maintenance, adjustments and other facts on care of the machinery is delivered with the equipment. Operating tips are passed along to your men—to help them get started right and get the most from their equipment.



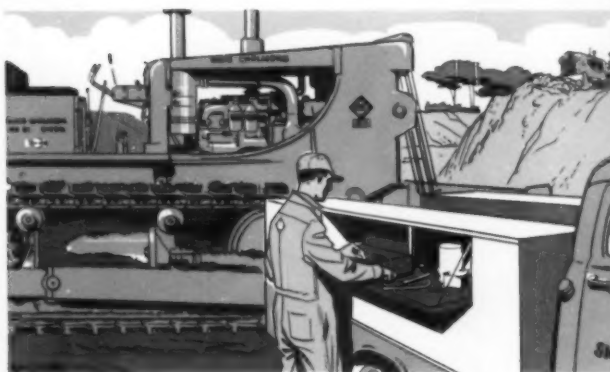
Service



Shop service at your Allis-Chalmers dealer is fast and efficient—because it's handled by factory-trained men, using factory-approved tools, equipment and methods. Specialized mechanics and special facilities all help to speed service.



Scheduling checkups with your Allis-Chalmers dealer will insure that proper maintenance procedures are followed . . . stop trouble before it starts . . . keep your machines producing.



Prompt field service—A call—any time, day or night—brings a qualified serviceman and a fully equipped "mobile workshop." Result—problems can be quickly and accurately solved . . . equipment put back on the job with minimum delay.

**... and
there's more
to this
Important story...**

your Allis-Chalmers dealer

ALWAYS READY TO ROLL...



... with qualified service ... original specification parts

ENGINEERED RIGHT

Allis-Chalmers parts are designed as original equipment ... benefit from intensive metallurgical research. And each comes from the drawing boards of experienced construction machinery engineers.

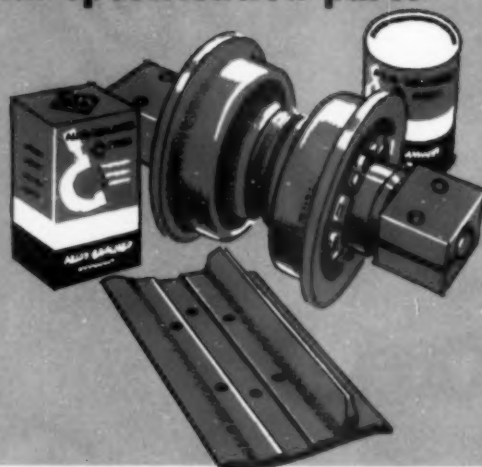
MANUFACTURED RIGHT

Precision-made parts assure long-life service. They're made by skilled craftsmen on modern industrial machinery and are subjected to original-equipment inspection and testing.

TO PERFORM RIGHT

Each part is made of top-quality material, heat-treated to correct hardness and made to exact specifications. You can depend on them for full-capacity production on the toughest jobs you have.

The men of your Allis-Chalmers dealer organization know local conditions. Look to them for equipment recommendations to fit your job requirements ... for true value in used machinery.



Look ahead...*move ahead*...and stay ahead

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



Equipment Maintenance, S. J. Groves Style

A peek at some of the equipment management and overhauling methods of one of the nation's largest highway-heavy contractors, as centered in the company's area headquarters at Springfield, Illinois.

By James R. Cummings, Assistant Editor

LIKE a victorious general, the successful contractor today wins his battles by tending to the details of his operation.

The Springfield, Illinois, branch headquarters of S. J. Groves & Sons Company is a textbook case on the proper care of a large inventory of construction equipment. On April 1, 1958, the Springfield office had under its wing about 520 major pieces

of equipment representing a "very substantial" investment. And its office and shop procedures are geared to get the most equipment working the most hours at greatest efficiency for the company. To achieve this, the Springfield branch exercises two major responsibilities:

- Supervision and allocation of all equipment under its regional command.

- A pair of LeTourneau-Westinghouse sheepsfoot rollers being readied for shipment to a job. As is frequently the case in this rush season, this tractor and trailer unit has been hired to help transport equipment.

Behind the Lines
with Successful
Contractors

One of a Series





● The Groves yard and buildings at Springfield. Low building with awnings is the office. Larger structure next, main shop. Paint shop juts out at the rear. Building at far left is for tools and used equipment. Visible in yard at left is concrete ramp for loading trailers.

- Repair and reconditioning of this equipment.

The Springfield center, with Illinois, Indiana and Missouri as its territory, is the headquarters of all equipment used on company jobs in this area. A tractor can be routed at any time by the Minneapolis home office to one of the other branch offices (New York City; Ann Arbor, Mich.; Woodbridge, N.J.; Syracuse, N.Y.), but the unit is the responsibility of the Springfield office for the period it is assigned there.

Thus the art of keeping tab on this machinery is a complicated one, not only because of the quantity and variety but also because equipment is

constantly en route to or being received from another Groves office.

System is needed—and system is used. Each unit of Groves equipment has a company code number. This code number, with the type, make and model number of the unit is at the top of an index card which is the "birth certificate" and "passport" of the equipment while in the Springfield territory. This card also contains the factory serial number, the attachments on the unit (power control unit, dozer blade, etc.) and a listing, taking up most of the card, under the headings FROM and TO—the office whence the piece came, and that to which it goes when it leaves Springfield.

The Groves code number is welded on equipment. If a unit is caught in a fire, its code number thus can always be retrieved and the unit identified through its file card.

The branch office allocates equipment to jobs the company holds in the territory. On April 1, five jobs were in progress in Illinois: two state highway jobs, near Bloomington and Champaign; the AASHO test road near Ottawa; and two Northern Illinois Toll Road projects near Naperville and Des Plaines. A clip board on each of these holds lists of equipment assigned to the particular job, parts ordered for replacement and equipment returned for repairs. The board hangs near the desk of Thomas Van Blair, shop superintendent.

Equipment stocked by supplying these jobs ranges from the largest earthmovers to the smallest pins and bolts. Besides the standard grading and paving machines and tools, the inventory includes accessory equipment—just to name a few items at

(Continued on page 82)



● Cable unit is hoisted back into place after being cleaned.



This core was cut
to show you . . .



88% stronger today! In 1958 a core cut from this road by a commercial laboratory tested 849 psi. Strength 11 years ago was 452 psi. Twelve per cent cement was used with a silty-clay soil.

11 years in use on this Madison County, Tennessee, road ...soil-cement pavement grows stronger year by year!

Core tests prove it on roads everywhere. Soil-cement is stronger inch for inch than any other paving material short of concrete.

Here's one low-cost pavement that actually grows stronger with age. It has beam strength, too. It spreads the load over the subgrade. You'll never have potholes, washboarding or soft spots with soil-cement roads. Maintenance costs stay low.

And first cost is low, too! (In most cases 75% of your materials are free!)

You mix with portland cement almost any type of soil including any old road surfacing. After the mixture hardens add a bituminous surface. You get a pavement good for 20 years plus.

It's the fastest-laid pavement there is. Well-organized crews have built two miles a day with modern road-building equipment. Today's engineers are making soil-cement America's fastest-growing, low-cost pavement. Write for free booklet, "Soil-Cement Pavement." Distributed only in U.S. and Canada.

Low cost . . . it's the
20-year-plus pavement for

ROADS • STREETS
SHOULDERS • SUBBASES
AIRPORTS • PARKING LOTS

MODERN
soil-cement

PORTLAND CEMENT ASSOCIATION

Dept. 5-28, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete

. . . for more details circle 297 on enclosed return postal card

"Our Ford Tandems outlast

*Says David Courtney, President
Courtney and Plummer, Inc., Neenah, Wis.*



"We've got '49 model Fords with over 400,000 hard miles on 'em . . . and they're still going strong!"

"Our Ford tandem dump trucks carry 8 yards of gravel and average about 50,000 miles per year. We've never had such good engine life, as with these Ford Heavy Duty V-8's.

"We started using Ford trucks with a model 'A' for dump service in 1930, and bought our first Ford heavy-duty job in 1949. After 125,000 miles of outstanding performance this F-8 was still running real good, so we added more Fords to our fleet. They keep working, year after year, with a minimum amount of upkeep . . . and that's really something in this business.

"With the addition of our four new '58s, we now have fifty-five Ford trucks and are very satisfied. And we like the fine service we get from our Ford Dealer. They always keep a complete stock of parts, so we don't have to carry any, and they stand behind what they sell 100%.

"I guess the best proof of how Ford trucks perform is the fact *we keep on buying more!* We just took delivery on a T-850 Extra Heavy with Super Duty V-8, and have several more on order for our transit-mix business."

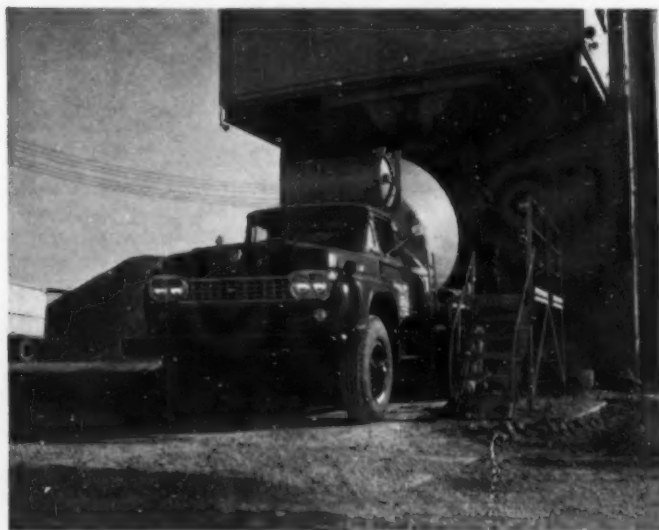
Official registrations show **AMERICAN BUSINESS BUYS MORE FORD TRUCKS THAN ANY OTHER MAKE!**

anything we've ever owned"



Taking big loads and all roads in stride, these Ford T-800 tandem dumps have built an outstanding reputation for performance and durability. Shown loaded with 8 yards of gravel, they daily deliver and dump tons of sand or gravel.

New '58 T-850 with 401-cu. in. Super Duty V-8 and front-end power take-off mixer drive... handles 6-yard loads legally.



**Bring extra savings
to your business...
make your next
truck a FORD!**

Official registrations for 1957 show that *American business buys more Ford trucks than any other make*. There are many reasons for this popularity... many reasons for you to make your next truck a Ford!

Ford trucks are your best buy! Ford's initial costs are *low* and resale value is traditionally high. The modern Ford Styleside pickups are the lowest-priced models available with full cab-wide body... giving you 23% more loadspace than any traditional type pickup box.

Only Ford offers the economy of Short Stroke power in all engines, Six or V-8. And Ford's Heavy Duty V-8's offer new, advanced durability features. The modern Ford Six, available in Light and Medium Duty F- and P-Series trucks, has a new carburetor that gives you up to 10% greater gas mileage. It's plenty peppy, too, with more horsepower per cubic inch than any other six in its class.

Ford's rugged cab and chassis construction means these new '58s are built to last. Every Ford has safety glass in every window. All this plus the proven fact that Ford trucks last longer adds up to America's No. 1 truck value. See your local Ford Dealer for the latest in '58 trucks or the best in A-1 used trucks.

FORD TRUCKS COST LESS

LESS TO OWN... LESS TO RUN... LAST LONGER, TOO!

... for more details circle 265 on enclosed return postal card

ROADS AND STREETS, July, 1958

81



● A new track is carried by an International truck to one of the bays where a tractor is being overhauled. Rolls of used track just removed are in left foreground.

EQUIPMENT MAINTENANCE

(Continued from page 78)

random—of Jaeger pumps, 1½ to 6 in.; Mall and Homelite gasoline chain saws; Kohler and G.E. light plants; Gardner-Denver and Ingersoll-Rand jackhammers; Inland Steel corrugated culvert pipe; and cutting blades stacked according to type and use and identified by their code numbers.

Five truck vans are parked in the yard for use when needed for parts storage on jobs.

But it's the "big stuff" that represents the greatest investment, and the chief management concern over full utilization. Groves efficiency, Springfield type, shows here to best advantage in meeting the needs of its field units. Here is an actual example:

(Story continued on page 84)

Some of the Groves Equipment Based in Springfield

(as of February 28, 1958)

TRACTORS AND DOZERS

18	Caterpillar	D8	
2	Caterpillar	D7	
2	Allis-Chalmers	HD-21	
1	International	TD-24	
1	Ford		utility tractor
1	Case	GT-25	

SCRAPERS

6	Euclid	14TDT	
5	Euclid	8TDT	
3	Euclid	23TDT	
3	LeTourneau-Westinghouse	Model D Tournapull	
4	LeTourneau-Westinghouse	Model C Tournapull	
3	Caterpillar	20 yd.	

MOTOR GRADERS

3	Caterpillar	No. 12	
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ROLLERS

7	LeTourneau-Westinghouse		sheepsfoot
1	Iros	67W	wobble wheel
1	Iros	45W	wobble wheel
1	Grace		pneumatic
1	American		sheepsfoot tamping

EXCAVATORS

1	Lima	¾ yd.	shovel-crane
2	Hendrix	1 yd.	drag line buckets
1	Hendrix	1¾ yd.	"
1	Hendrix	¾ yd.	"
1	Williams	1½ yd.	"
1	Page	¾ yd.	"
2	Kiesler	1 yd.	clamshell buckets
1	Owens	¾ yd.	"
1	Haiss	¾ yd.	"

LOADERS

1	Allis-Chalmers	HD-5G	
---	----------------	-------	--

TRUCKS

2	Ford	F-600	flat bed
2	Ford	F-800	truck tractors
1	Ford	F-1	pick-up
5	Ford	F-100	"
2	Ford	F-250	"
1	Ford	F-6	boom truck
1	International		"

1	Ford	F-700	with bulk cement body
1	Ford	F-700	with 2,500-gal. water tank

TRAILERS

3	Fruehauf		vans
1	Transport	GPX-27F	equipment
1	Dorsey	DGT-18	lab. trailer
1	International		tandem van
1	Trailmobile		

LIGHT PLANTS

1	Onan	5,000 watt	
4	Kohler	1,500 watt	
1	Kohler	2,000 watt	
6	G.E.	16 KW	

PUMPS

1	Jaeger	1½ in.	
1	Jaeger	3 in.	
1	Marlow	4 in.	

WELDERS

3	Miller	200 amp.	
1	Hobart	200 amp.	
1	Hobart	320 amp.	

SERVICE AND LUBE EQUIPMENT

1	Lincoln		convoy luber
1	Grayco		"

PAVING

1	Blaw-Knox		twin electric cement batcher
2	Highway		bulk cement bodies
2	Cleveland		form tampers
1	Cleveland		"Trailgrader" with bridge

MISCELLANEOUS

2	Thor		wagon drills
1	LeTourneau-Westinghouse		tractor crane
1	Pitman	Model B	"Hydra-lift"
1	Fairbanks-Morse	20 ton	truck scales
1	Roscoe	B-7	power boom
1	Barber-Greene		car unloader
9	Caterpillar	8-5	dozer blades
12	Caterpillar	No. 25	power control units
6	Caterpillar	No. 29	"
3	Gar Wood		"
1	Mentes-Williams		stone spreader
1	Ingersoll-Rand		gas compressor



Push-loaded C Fullpak gets 16 yds. of sandy clay loam at end of ditch cut, and hauls to fill at bridge approach.

Short 180° U-turn maneuverability of C Fullpak, plus 40° horizontal oscillation between prime-mover and scraper, let rig position quickly at start of ditch cut.



How Iowa Contractor worked 5 'Pulls* on 4 CYCLES IN ONE DAY to speed widening of U.S. 75 near Sioux City

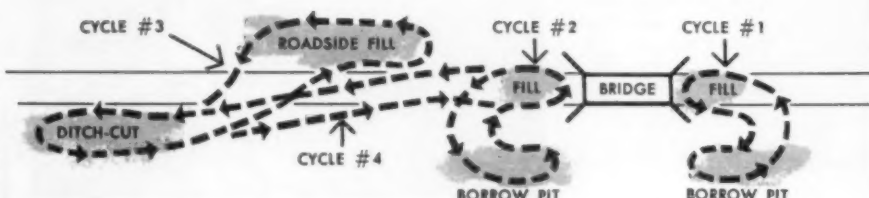
Contractor: Booth & Olson, Inc.,
Sioux City, Iowa.

Job: Widen 4.6-mile stretch of U.S. Hwy. 75, near Sioux City, from 2 lanes to 4. Contract calls for moving 300,000 yds. of material. Job includes grading, ditching, and shoulder work.

Material Handled: Sandy clay, with some gravel and loam.

Equipment: LeTourneau-Westinghouse Tournapull® scraper fleet — including 18-yd. C Fullpak®, two older model 16-yd. "C"s, and two 9-yd. "D"s. Also on the job were three heavy-duty graders and two 155 hp crawler tractors.

How Job was Handled: Booth & Olson made good use of their fleet of 5 Tournapulls on these 4 different cycles. Here's how they worked them.



In the morning of one day, one "D" worked on cycle #1, hauling from low roadside borrow pit to fill bridge approach. Other 'Pulls worked on opposite end of bridge. Later, one C Fullpak and two D Tournapulls worked cycle #2, filling at other side of the bridge approach with the material hauled from another roadside borrow pit (see above sketch).

In the afternoon, the Tournapull fleet was used in this manner: the 2 "D"s were used on cycle #3 to cut a ditch and spread material in low area across the road. On cycle #4, the C Fullpak and 2 older model C Tournapulls were also used to cut ditch but material was hauled to fill at bridge approach.

By operating all these cycles in a single day, Booth & Olson were able to speed overall progress of the job. Flexibility and mobility of Tournapulls helped contractor maneuver his fleet on a moment's notice to work on most critical assignments as needed — often on 2 or 3 at the same time.

Machine Performance: Time study on cycle #4 showed that Fullpak, operating between ditch and bridge approach, averaged 16 yds. of sandy clay every 6.24 minutes on 3880' cycles...

for a 50-min. hourly production of 128 yards. Fullpak was push-loaded by a 155 hp crawler tractor in an average of 1.29 min., over a distance of 160' — in spite of operating in and out of a 6' ditch, and 25' of steep up-grade haul.

Summary: Job was kept on schedule. One factor which helped Booth & Olson's production is Tournapulls' maneuverability (electric kingpin steer machines can make 180° U-turns in less than their own length). Also, Tournapulls' exclusive power-transfer differential keeps machines working in wet weather and soft footing to hold "shut-down" time to a minimum. Power-transfer differential automatically transfers up to 4 times the power from slipping wheel to the wheel on firmest footing. Another factor in maintaining production schedules is the faster loading cycles provided by the low, wide bowl of the C Fullpak Scraper.

It will pay you to investigate the high-production C Tournapull with 18-yd. Fullpak Scraper, and the improved 9-yd. D Tournapull Scraper. "D" is roadable in 48 states without permit ... has 8' wide road clearance and meets 9-ton axle-load limit. Write or 'phone for all the facts.

*Trademark CPDP-1605-DCJ-1



Improved 9-yd. D Tournapull with wide-base tires spreads sandy clay material on roadside fill area for Booth & Olson on U.S. Hwy. 75 widening job near Sioux City.



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 288 on enclosed return postal card



● A minor welding job on a D8 scraper.



● Percy Nelson assembles a D8 motor after overhaul.



● A part being steam-cleaned in the combination cleaning-painting room.



● Al Hollingsworth, parts manager, goes back to the shelves for a replacement item.

Late on a Tuesday afternoon, a phone call is received from the state job near Bloomington. A Cat D8 has suffered a broken shaft on the steering clutch, and "... we need a dozer."

At 5 a.m. Wednesday, a Dorsey DGT-18 trailer behind a Ford T-800 "Big Job" pulls out of the yard with another D8, reconditioned and ready for work.

At 11:20 a.m., the other equipment trailer, a Transport GPX-27F, arrives with the disabled tractor. It is put on the shop schedule and will be ready for a return to field work in 48 hours.

An important operation of the Springfield office is the winter-time reconditioning of equipment in preparation for the work season. The Groves Company has established here a complete shop which can—and does—tear down and reassemble the largest equipment.

● According to Van Blair: "They say you can rate a contractor by the care he gives his equipment. Well, we do all we can to insure that our machines do their job properly in the field. That's why this place is so busy in the winter, with 25 mechanics instead of five. We are getting our big pieces all tuned up and ready to go. And they go through this process *every* winter, not just when they need repairs or are getting old."

But Groves spends its money careful. The winter reconditioning process is not a come-one-come-all-and-tear-everything-down invitation. Most of the work is carefully plotted in advance.

In the fall of the year, Van Blair, notebook in hand, makes the rounds of all the company jobs in the territory. Accompanied by the field mechanics, he inspects the equipment to ascertain repair needs, jotting down replacement parts which can be ordered in advance.

These field reports are written up and held in readiness for the arrival of the specific units.

When one of the company's fleet of heavy tractors arrives at Springfield for its annual "health course," it is assigned to two shop mechanics. As the first step, the tractor is torn down. The parts are taken to the painting-cleaning room where they are steam-cleaned with a high pressure hose.

The equipment here consists of a Drill cleaner with a 100-gal. hot water heater. Water heated to 190 deg. is nozzled out a 400-lb. pressure with a liquid cleaning compound added.

(Continued on page 90)

Want to make an extra \$70 per day ...per scraper?



Bigger graders can speed-up your big-yardage dirtmoving

The saving of just a few seconds on your dirtmoving cycle is mighty important... especially on your big-yardage jobs. For example, say you're working scrapers that haul 20 pay-yards, and each moves 100 loads per 10-hr. day. That's an average cycle of 6 minutes. When you shave just 33 seconds off this average cycle, you get 10% more output, or 110 payloads per scraper each day.

Those 10 extra loads give you 200 *bonus* pay-yards, at no extra cost. Even with dirt at the minimum bid price of 35¢ per yard, that's an extra \$70.00 a day in the profit column for each scraper you use!

Here's how you get it

Your scrapers always work faster when haul roads are kept smooth, and job is well drained. They move more loads when fills are firm and graded... when borrows are kept bladed for easier loading.

For most profitable big-yardage dirtmoving you need graders that can keep pace with your big scraper fleet. You need big, heavy, 150 hp

or larger graders to help you save valuable seconds on each dirtmoving cycle... to help you move more 20-yd. loads per hour.

On the fill, your bigger grader spreads a full 12' or 14' blade-load of dirt at speeds to 7.5 mph... quickly grades for speedy compaction... levels footing for on-the-run dumping of next lift. In the cut, it smooths-out ruts and bumps... scarifies tough spots... blades down heavy side banks... casts out ditch-bank corner material... maintains drainage for extra days production during rainy seasons.

With its extra weight and power, your 150+ hp grader handles all jobs fast. It stays ahead on production, so whenever needed, it can smooth haul roads to keep your dirtmovers "highballing". Working faster, blading more yardage, your bigger graders smooth the way for faster earthmoving at every point in the cycle... for bigger output and extra earnings from every scraper on your job. They also cut accurately, to speed-up your finishing, get you off the current job, ready for the next one faster. And they help you get your final settlement quicker.

Fewer machines... lower cost

To do the same amount of work with ordinary 115 hp graders, you need **MORE MACHINES... MORE MANPOWER... MORE TIME.** And extra graders slow-down your dirtmovers and compactors.

You'll get more work done faster — less congestion — with Adams* 150 hp or 190 hp Model 660 graders. And you'll get it done at lower cost. These heavy-duty LeTourneau-Westinghouse graders give you the extra power, weight, and speed you need, to handle your future big-volume contracts faster. They'll give you up to 30% more output for only about 8% increase in ownership and operating costs.

Two extra-output models

Adams 660 is available with 2 power and drive options: (1) 150 hp GM or Cummins engine, constant-mesh transmission with 8 speeds forward (to 26.0 mph), 4 reverse (to 13.7 mph), plus 3 optional creeper speeds; or (2) **POWER-Flow*** 660 with 190 hp GM or Cummins engine, torque converter, 4 speed ranges forward, 0.0 to 27.4 mph. Call or write for an immediate demonstration.

*Trademark G-1561-DC-1

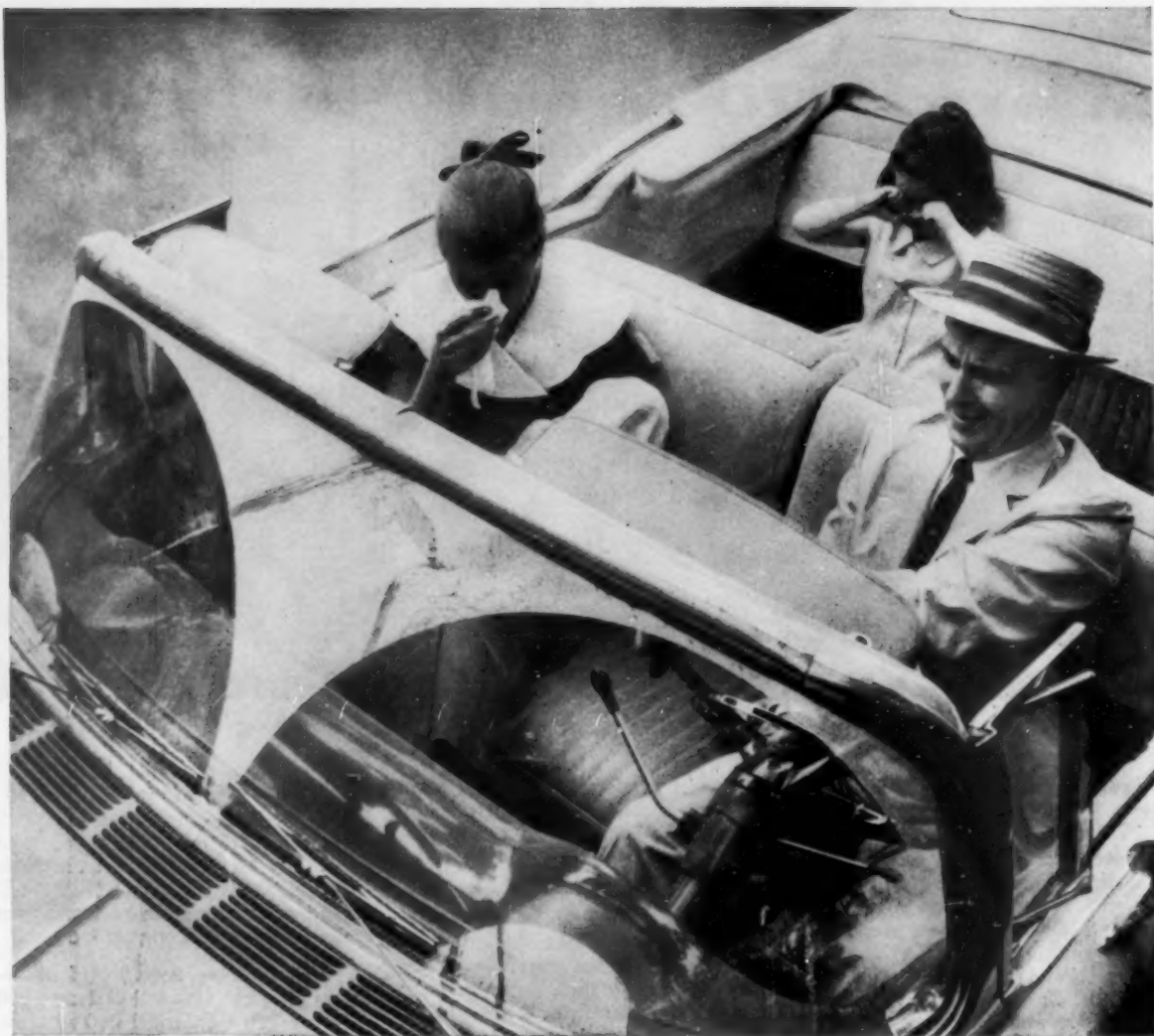


LETourneau-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

... for more details circle 289 on enclosed return postal card



Motorists hate dust. So do homeowners. It doesn't help crops or livestock, either.

Costs so little to save their comfort and goodwill

Columbia Calcium Chloride treatment ends irritations and danger from road dust

Dust gets into their eyes, noses, mouths, onto their clothes. Dust dirties them. Dust obscures the road ahead, cutting down their driving efficiency. All in all, dust makes them mad. Why not?

Every road official knows that dust, a heavy summer irritant, *can be controlled*. Columbia Calcium Chloride lays dust during the hot, dry months. And eliminates dust discomfort and danger at *surprisingly moderate cost*. If your spring shaping and maintenance was good, roads generally need only two

light "sweetening" applications of Columbia Calcium Chloride to keep surfaces dustfree throughout the summer. Total application seldom runs above a total of two pounds of Regular, or 1.6 pounds of High Test, per square yard.

Columbia Calcium Chloride is your best bet for stabilizing shoulders and improving detours, too. You're assured of safe, smooth, dustless driving conditions and decreased maintenance.

Order enough Columbia Calcium Chloride today. For more information,

contact the Calcium Chloride Department at our Pittsburgh address, or at any of our thirteen other district offices.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER • PITTSBURGH 22 • PENNSYLVANIA



DISTRICT OFFICES: Cincinnati • Charlotte
Chicago • Cleveland • Boston • New
York • St. Louis • Minneapolis • New
Orleans • Dallas • Houston • Pittsburgh
Philadelphia • San Francisco

IN CANADA: Standard Chemical Limited

... for more details circle 258 on enclosed return postal card

Accept this

L-W

CHALLENGE

**...to UP your
PROFIT MARGIN**

Yes... prove to me that L-W 210 hp C Tournatractor will handle more of my tractor jobs, in less time, at a lower cost. Phone me on or about at to arrange for a demonstration on one of our jobs.
(date) (number)

Name Position

Company

Address

City State

(Fill out and mail to your LeTourneau-Westinghouse Distributor)

We will prove to you that

**210 hp Tournatractor[®]
handles more tractor jobs
... faster ... at less cost**

than any other tractor in its class

During the past few years the popularity of this heavy-duty rubber-tired tractor has increased rapidly, and there's good reason for it! As work areas grow bigger and bigger, the need for tractor *speed* and *mobility* becomes more and more important. And speed and mobility, as well as power and traction, are the plus-values you get in the 17 mph, 210 hp Tournatractor.

The place for Tournatractor in your fleet is on hit-and-run jobs, stockpiling, haul-road maintenance, back-filling, towing compactors, leveling fill, handling production push-loading, doing widely-scattered dozing jobs that you want done in a hurry. There's no waiting for truck and trailer, no time lost loading and unloading. Tournatractor "runs" from job to job, often completes one job and begins another before a slow-moving crawler gets started. The price?... probably *less* than any other tractor of similar weight and horsepower, and certainly less expensive to maintain and operate.

It will cost you nothing to *find out* about Tournatractor. Fill out the above "request for demonstration" on one of your jobs. Mail it to your LeTourneau-Westinghouse Distributor.



Operators like Tournatractor's smooth torque converter that balances power to load... its electric push-button controls... its up-front

clear view... its big, safe-stopping brakes. And you will like the extra daily job completions your operators will be able to turn in!

CT-1928-DC-1

LETOURNEAU-WESTINGHOUSE COMPANY

PEORIA
ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

... for more details circle 290 on enclosed return postal card



He moves big yardage on housing development

with two self-loading 7-yd Allis-Chalmers motor scrapers
... hauling 1,500 to 3,000 feet



K. L. Perry
K. L. Perry Excavating Co.

On a new development location for a big residential subdivision, K. L. Perry Excavating Company of Kansas City, Missouri, has found a new and profitable earth-moving team—two Allis-Chalmers TS-160 motor scrapers. Perry bought them on the basis of a demonstration which proved their maneuverability, speed and ability to self-load. Now the TS-160's have sold him on dependability and economy, too.

One of Perry's self-loaded TS-160's leaves the cut as the other returns to keep up the 1,000-yard-a-day pace on Vineyard Woods job.



Look ahead... *move ahead*...and stay ahead with



Short turning radius (less than 25 ft) and positive hydraulic control make maneuvering through tight spots a simple operation for Perry's TS-160's.

The TS-160 is the only motor scraper near its size available with forced ejection and extra high apron lift that assures easy ejection of toughest material.



TS-160's move dirt faster . . . cut operating costs in half

Earth-moving operations in modern housing developments have to move fast to keep costs low . . . and to set the pace for production line methods in home construction. On the Vineyard Woods job, for instance, to maintain the building program, Perry had to average 500 cubic yards per day, hauling up to 3,000 feet.

His two Allis-Chalmers TS-160 motor scrapers handled it with plenty to spare. Self-loading, they frequently topped 1,000-yard production daily. At the same time, operating costs were cut in half compared to his previous equipment. Perry says his Allis-Chalmers motor scrapers are big producers . . . helped him finish contracts days ahead of schedule. He now bids and makes a profit on contracts he couldn't consider before.

Self-loading, compactness and maneuverability make TS-160's naturals for development work

Primary factors in Perry's choice of Allis-Chalmers TS-160's were their demonstrated high-speed and self-loading ability. However, since he's had them, other benefits have become apparent. Perry is particularly pleased with their maneuverability. They turn in less than 25 feet—a valuable timesaver in limited space on many housing development operations. Hydraulic power steering makes maneuvering in tight quarters easy and efficient.

They also save time and money between jobs . . . move on highway at up to 25.4 mph. Operator comfort and ease of handling were noted as outstanding by Perry and his crew.

Performance sold the machines . . . dependability proved their value

K. L. Perry checked them all when he was in the market for high-speed dirt-moving equipment. He says, "We were sold by demonstration that the Allis-Chalmers machines were best—but the real proof came with performance like we had on the Vineyard Woods development in Kansas City. We've had only routine maintenance on the machines in eight months since we bought them. They put us in position to get the 500-home Kentucky Hill job at Independence, Missouri."

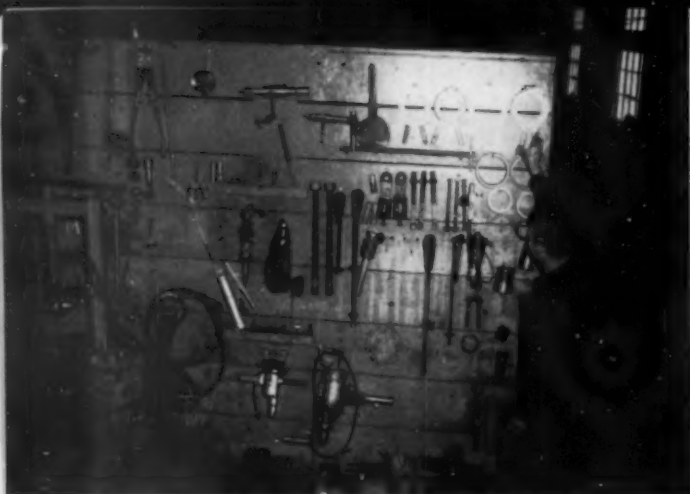
This TS-160 motor scraper story is a good example of the value in talking things over with your Allis-Chalmers construction machinery dealer. He knows the earth-moving business and can help you choose the machines that will help you most. Ask him for a demonstration right on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



. . . for more details circle 238 on enclosed return postal card

ROADS AND STREETS, July, 1958



● The shop tool board. The injunction is: "Return the tool when you're through with it."



● Bill Sullivan at a workbench grinding valves on a cylinder head.



● A reconditioned Cat D8 is loaded and on its way to another summer season.

EQUIPMENT MAINTENANCE

(Continued from page 84)

The parts are returned to the tractor and each is examined for condition. Welding is done wherever needed, using Wilson and Lincoln 300-amp. electric welders, with

Lincoln, P&H, and Airco rods, again to cite a few trade names. Controls and cable units are inspected. New rims are put on sprockets, and track is replaced if necessary. The engine is taken down completely; valves are ground, new plugs and points installed, bat-

tery replaced when needed.

When the machine is reassembled, it is brought back to the paint shop where it receives a spray coat of its original color.

Fifty percent of the equipment brought into the shop this past winter came from the Northern Illinois Toll Road. Since most of the earth-moving is now finished on these jobs, the dozers and scrapers were slated to go to the two Illinois state highway jobs and to any others the company may be awarded in the late spring and summer in the three-state area.

Beginning on January 6, 1958, the shop overhauled the following major equipment: 21 Caterpillar D8s; 4 D7s; 2 D6s; 12 Euclid scrapers, models 14 TDT and 23 TDT; 4 Caterpillar 12 motor graders; 5 Caterpillar 80 scrapers.

The shop has five bays, three of which, constituting the main section, are served by a Conco trolley crane and a Yale and Towne hoist. This is the section where the big equipment is handled; two of the three bays will accommodate a 20-yd. Euclid scraper.

The second section takes trucks and at busy times, any of the larger units which have no need for hoists.

Even with Groves' efficient setup, the reconditioning of heavy equipment is expensive. The cost to the company—parts and labor—of overhauling one of its tractors, for example, ranges between \$4,000 and \$6,500. The differential here consists mostly of the track; if this must be replaced, the new track costs about \$3,100.

The Groves-Springfield parts department faces that old bogeyman

● Cutting edges are stockpiled according to type and used, with identifying parts number on each stack.



ROCK DRILLS

(Continued from page 60)

progress today; also Gardner-Denver sectional carburized drill rods and couplings.

(2) Working either independently or teamed up with other drilling equipment, was a special Brewster-built rig consisting of a pair of Joy drills mounted on a Cat D8 tractor along with a compressor and also, for measure, a dust collector. (Also pictured). The drills used 1 3/4 or 2 in. hard-rock bits. Working in sandstone and shale the unit typically sank as high as 1,400 to 1,500 ft. of blast hole in a steady day. Footage, however, went as low as 600 ft. when hardest rock was encountered.

(3) A third type of drill used consisted of two Mayhew rotary drills, truck-mounted, which were concentrated in the big shale cut. These rigs used bits of 6 to 6 3/4 in. size and sank holes to 75 ft. or the full depth of the cut for a single shooting. (A Bucyrus-Erie 120-B 6-yd. electric shovel supplied by a D397 diesel-electric generator of 4,000 kw capacity, trailer-mounted, was used in this cut.)

Nevada U.S. 40—Isbell Construction Co.

Project: A dualization and partial realignment, east of Reno, Nevada. Summer and autumn of 1957.

Rock Excavation: Relatively heavy grading ran high in rock work, and involved single cuts up to 130,000 cu. yd. maximum. Relatively easy rock, but highly irregular and fissured.

Equipment: Principal drilling equipment consisted of a Bucyrus-Erie 40R rotary quarry drill with 9-in. bit. (Pictured). Holes for 15 ft. or larger lifts were drilled on

about a 14 x 15 ft. pattern. A Bucyrus-Erie 110-B, 5-yd. electric shovel worked in conjunction, powered by a trailer-mounted diesel-electric generator.

Elsewhere on this largely side-hill job, various smaller drilling units were employed. The Northwest 80D shovels did extensive sidecasting, supported by lighter drills and compressors selected or mounted for mobility in reaching pioneer benches.

Ohio Route 7—Ralph Myers Contracting Corporation

Project: Reconstruction of 3.2 miles of State Route 7 along the bluff paralleling the Ohio River, south of Steubenville.

Rock Excavation: 1,100,000 cu. yd. of rock excavation required in one large continuous cliff-side cut, in 3,200 ft. of project length. Cut reaches maximum of 198 ft. on high side, with depth of over 100 ft. for most of distance.

Equipment: Followed by a fleet of bottom-dumps and two Northwest 80D shovels, two large drill rigs paced this job. Some locations were drilled and shot working entirely across at a single shelf level; at other times, work was done at two levels with one shovel on each.

One drill consisted of a Davey rotary drill mounted on a GMC 3-ton 10-tired truck with Eaton tandem rear axle. Owned by Cambodia Drilling Co., this unit used a 5 1/2 in. Williams 3-cone high-carbon-steel rotary bit. The truck also carried a Davey 400 cfm (6 cyl.) compressor with GM Detroit Diesel 3-71 engine, and an American Blower Company type D Rotoclone for blowing out holes. The rig was designed as an assembly by Davey.

Using a maximum thrust of 25,000 lb. on the bit, this machine

drilled holes usually for 20 and 22 lifts (depth was only 12 ft. at point of accompanying photographs, near cut end). Drilling relatively soft white sand rock and shale, hole production ran 700 to 900 ft. per 10-hour day. This was "extremely good going," however, as noted by foreman Richard Binnie; as low as 200 ft. was considered a good day in very hard rock in this region with this outfit. Hole patterns up to 14 x 15 were used, with a 10 x 10 ft. spacing for the shallower (12 ft. cuts).

Bits were being retipped every 2,000 ft. or less of hole in this very abrasive formation using an acetylene torch to build them up.

The other drill was a Joy 58-BH Heavyweight Champion, a self-contained machine (also pictured) carrying a GM Detroit Diesel 3-71 engine for operating the drill, and a Joy 1,200 cfm compressor for blowing out holes. Bits were Gruendler hard-steel 6 1/4 in. Footage was about 600 ft. per 10-hour day in rather hard rock and tight formation. Data not obtained on yield of either of these machines.

This 2-drill, 2-shovel outfit despite hampering circumstances of traffic handling, built up to a 100,000 cu. yd. peak monthly output, working two shifts at times.

Tractor Plant Enlarged

Doubling of facilities at the Detroit Tractor Plant of Massey-Ferguson, Inc., was completed recently with a full-scale grand opening ceremony for the enlarged plant. With the \$3,500,000 expansion and modernization program, the company will increase production both in its industrial and farm tractor lines. The plant has a capacity of 250 tractors per shift, one every two minutes.

EQUIPMENT MAINTENANCE

(Continued from preceding page)

of all construction parts in departments: how to maintain a balance between parts which are used frequently and those asked for once a year. And the latter are not dismissed easily by this contractor, because, according to the Groves profit-and-loss evaluation, it's easier to stock a part than to send 1,000 miles for it while a scraper is pushed off in a corner at \$100 an hour.

Therefore, Hollingsworth tries to keep an efficient balance. Few

Caterpillar engine parts are stocked because of the proximity of the dealer. With that exception, a full inventory is kept on the fast-moving parts used on every machine.

The company had 34 Euclid scrapers in the Springfield territory over the winter—29 with Cummins engines, five with GM Detroit Diesels. For repairs or overhaul, here is a sample of the work the shop can take care of from its standing parts inventory on diesel engines:

- 2 to 2 1/2 complete engines.
- 3 transmissions, Fuller 10-F 1220.

- All bearings and seals on rear wheels.
- 2 to 3 differentials, all bearings, side gears, spider gears.
- All cutting edges, hydraulic pumps.

In sum, 80 percent of replacement parts for a Euclid scraper with Cummins engine is carried in stock.

The Springfield shop does not concern itself too much with tires, as 90 percent of these are purchased and installed in the field. Used tires are put to further service when possible, often being mounted, for example, on field tool wagons.



A-W Super 99 equipped with Torquematic Drive working in deep mud near Norfolk, Va. Machine is owned by Williams Paving Co., and is operated by Golden Barber.

"The Austin-Western works where

"The Austin-Western's all-wheel drive and all-wheel steer give it a big advantage over other graders," says Ed. Williams, v-p of Williams Paving Co., Norfolk, Va. "With its extra traction and maneuverability, the A-W works where other graders can't go. It is especially good for grading steep slopes and for getting in and out of tight places—for example, working around the stakes during last-stage grading.

"Another feature that makes the

A-W a superior machine is its ease of operation. I am an operator myself, and I appreciate the quick, positive action of the hydraulic controls. Furthermore, as an owner, I like A-W's low operation and maintenance costs."

Some big A-W features. One of the reasons the A-W outperforms ordinary graders is extreme blade reach. From any normal operating position, you can extend the blade hydraulically into position to handle almost any

type of job. Precision sideshift and circle sideshift give you unusual reach and by using all-wheel steer to offset the rear truck, you can obtain several extra feet of sideshift more than with competitive types. And all-wheel drive keeps the power of the grader balanced against the load, regardless of blade position, for added efficiency.

With an A-W, you can do precise finishing operations never before possible with a motor grader, quickly and



other graders can't go" *says Ed. Williams, Williams Paving Co.*

easily. Extra wide shoulders, as well as slopes of any kind, can be accurately finished without tire marks being left. Long slopes can be worked

up from the bottom or down from the top with equal ease.

If you are a contractor that wants a long-term investment in efficiency,

get the full story on Austin-Western today. Your nearby A-W distributor will be glad to arrange a convincing demonstration.

... for more details circle 235 on enclosed return postal card

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes





We speak your language

The language of *service* and *engineering assistance* wherever and whenever you need them.

The reel of Roebling Stress-Relieved Strand for prestressed concrete that you see here is but one of many elements of prestressed concrete... every one of which Roebling is familiar with and many of which Roebling has instituted and developed.

Fourteen years of experience in every aspect of the prestressed concrete field—tensioning elements, strand development, design procedures, the development and introduction of

the stress-relieving process for the uniform behavior of tensioning wires and strands—enable Roebling to *deliver* much more than the strand on the reel.

This from the oldest manufacturer of wire rope in the United States: the highest quality stress-relieved strand delivered in a "package" you cannot get from any other source in the world.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



**Consult Roebling
... First in
the U. S. with
Prestressing
and Tensioning
Elements**

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How To Do Box Culverts?

This "Sub" Used Portable Plant and Truck Mixers

The handling of concrete box culverts and other miscellaneous concrete along rural road jobs has always posed a problem to the contractor. The best method of handling this end of the work depends on many factors, of course. Pictured here is one contractor's answer—as devised for one of New Mexico's Interstate projects, under construction on U.S. 85 near Santa Fe.

Metropolitan Paving Co. subcontracted a good many items on this \$2 million project to the Santa Fe firm of Reeder Construction Co. whose project superintendent is M. R. Blair. A principal item in Reeder's subcontract was the supplying of concrete for several large box structures at remote mountain-road locations.

The concrete mixing and delivery was handled in a Hardy 6 cu. yd. batcher with Hardy dial scales located midway along the project and near a creek for water supply. The batcher was supplied with aggregates and bulk cement dumped together in a hopper, via an Atlas 30 ft. x 24 in. conveyor belt powered by a Wisconsin 11 hp motor.

The hopper was tripped by a lever from the ground. Consecu-

tively it was loaded with sand, stone, and cement broken out of bags, using a Scoopmobile loader.

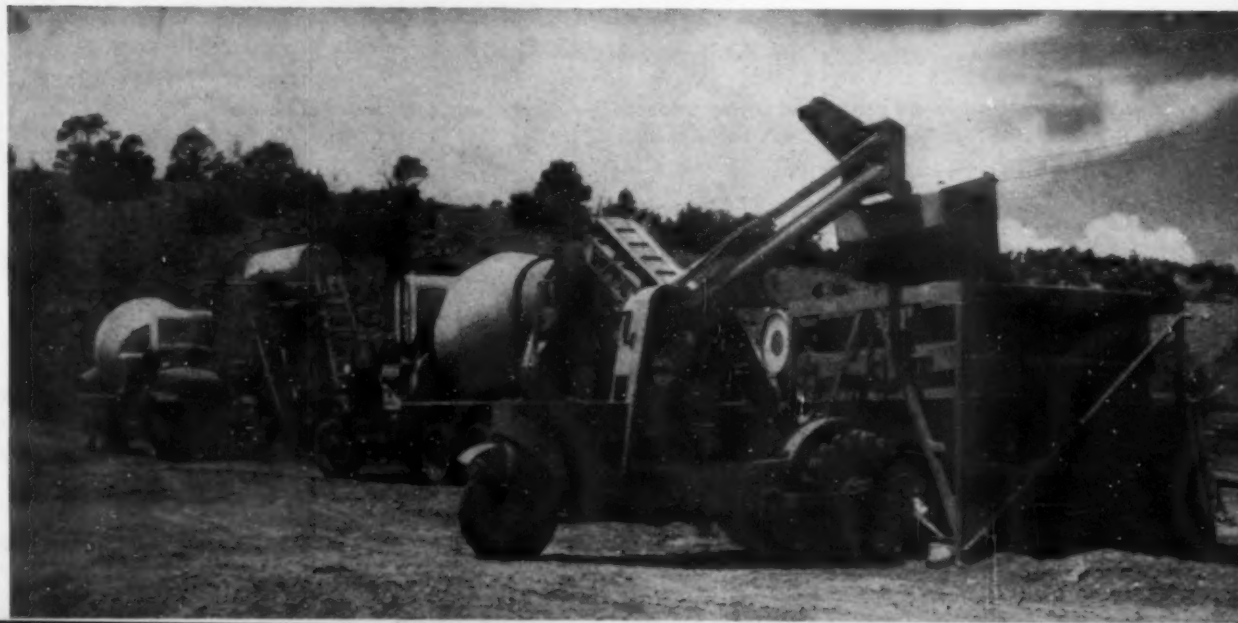
The aggregates were belted directly into one of several company

owned Whiteman Champion 7-yd. truck mixers. The mixers took on water from a gravity tank supplied by a booster truck with 2 in. pump. Each truck mixer carried a



● Whiteman Champion 7-yd. truck mixer waiting to take on water. Water supplied to elevated tank by booster truck.

● Reeder's concrete plant for culvert work included front-end loader, portable hopper and belt, water supply tank, and several company-owned truck mixers, as related in accompanying article.





More Rex[®] Pavers than all others!

ROCKFORD

20 pavers on the Illinois Tollways are REX PAVERS!

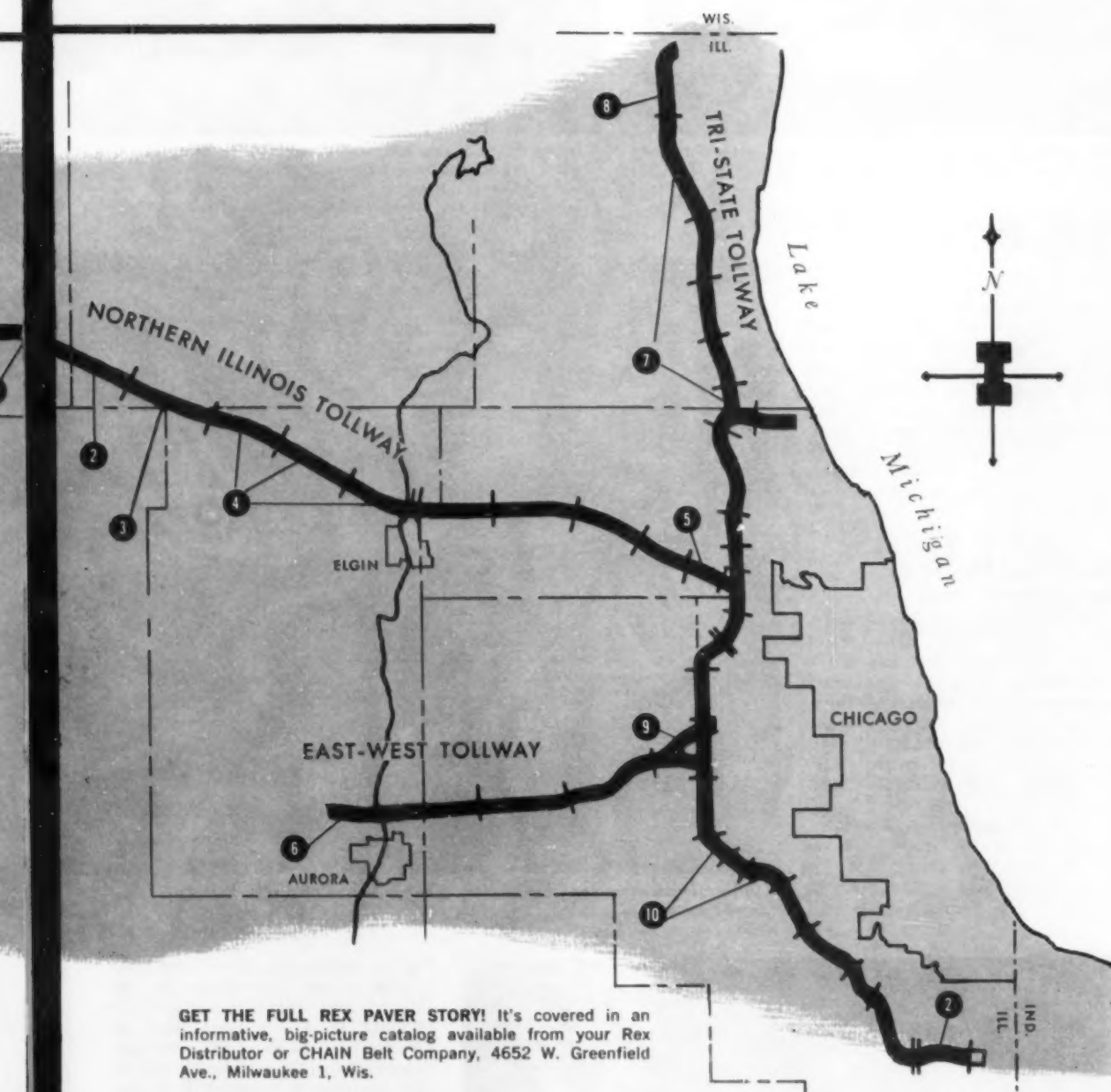
All these contractors are getting fast paving production—lowest paving costs with Rex Pavers.
(Numbers identify contracts handled by these contractors)

- ① Charles Ind Co.—2 Rex 34ED Pavers
- ② Standard Paving Co. and Peter J. Crowley Co.—3 Rex 34ED Pavers
- ③ M. J. Boyle & Co. and Ryan Construction Co.—3 Rex 34ED Pavers
- ④ McCarthy Improvement Co., H. H. Mass Construction Co. and Dillon Stone Co.—1 Rex 34ED Paver
- ⑤ Joseph Bonness, Inc.—2 Rex 34ED Pavers
- ⑥ Central Engineering Co.—2 Rex 34ED Pavers

- ⑦ Eric Bolander Construction Co. and E. A. Meyer Construction Co.—2 Rex 34ED Pavers
- ⑧ L. G. Arnold, Inc.—2 Rex 34ED Pavers
- ⑨ Hedges Construction Co. and Ryan Brothers Co.—1 Rex 34ED Paver
- ⑩ Orr Construction Co.—2 Rex 34ED Pavers

In addition, these and other contractors are using Rex Concrete Finishers, Spreaders, Floats, Curing Machines, Burlap Drag Machines, Forms, Moto-Mixers, Batching Plants, Railporter and other Rex Construction Machinery.

on Illinois Tollways



GET THE FULL REX PAVER STORY! It's covered in an informative, big-picture catalog available from your Rex Distributor or CHAIN Belt Company, 4652 W. Greenfield Ave., Milwaukee 1, Wis.



MOTO-MIXERS • BINS AND BATCHERS • BUILDING MIXERS • PUMPCRETE • RAILPORTER

CHAIN BELT COMPANY

® PUMPS • PAVERS • SPREADERS • FINISHERS • FLOATS • CURING MACHINES • FORMS

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ROADS AND STREETS, July, 1958



● Mixermobile alternately handled cement (being dumped here from bags), rock and sand into the hopper.



● Hardy batcher and dial scales shown here along with Jack Reeder, who expects to handle parts of big highway jobs in New Mexico, in addition to local concrete and street work around Santa Fe.

200 gal. tank for adding water to the drum in transit. Water supply came from a Carver 6-in. pump with Continental diesel engine located at the nearby stream.

According to Mr. Reeder, it took only $3\frac{1}{2}$ minutes to charge sand, rock and cement for a 6-yd. batch, using this easily set up plant. Concrete was placed in the culvert forms by a Link-Belt Speeder crane with 1-yd. drop bucket and the usual vibrators. A 40-ft. Mulkey concrete conveyor was also used on this job.

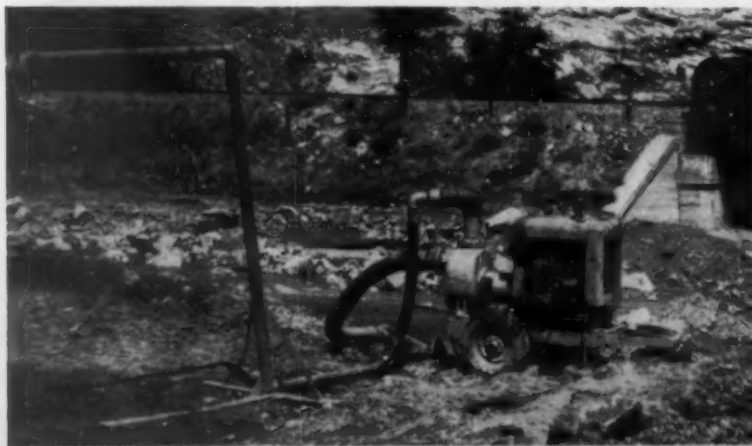
Educational Movies By United States Steel

United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Penna., has issued the 20th edition of its catalog of company educational motion pictures.

Available upon request at the above address, this catalog describes especially the most recently released films, which include: "Cantilever Bridge," "Dan Taber's Ledger," "Knowing's Not Enough," "Mackinac Bridge Diary," "Practical Dreamer," "Research in Steel," "Steel Buildings For Better Farming," and "The Suspension Bridge."



● Culvert being concreted from Reeder's truck-mixer, using a Link-Belt Speeder crane.



● An innovation in toll road management was announced by the Florida state turnpike authority. A "Night Flight" Express plan includes bargain rates for passenger cars and trucks which enter the super highway between 10 P.M. and 6 A.M. The lower rates apply even though the trip is not completed during this interval.

● Four-inch pump supplied tanker with approved "branch water" for the Reeder's concrete.

FOR HIGHWAYS WITH
A SOLID FUTURE...

Concrete



On the Indiana Toll Road they saved \$9,740,000 by paving with **CONCRETE**

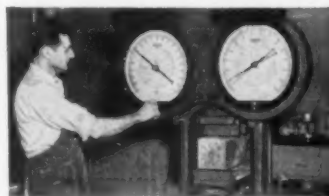
Actual cost figures for the two types of pavement tell the story!

Indiana Toll Road engineers drew up designs for both types of pavement . . . each to carry the same axle loads, each to be the best of its type. Realistic comparison of all paving costs, from grading and sub-base preparation to finished surface, gave the answer: *Concrete would save \$62,436 per mile!*

Indiana's experience demonstrates once more that concrete can give lower initial cost. And you get a pavement of mathematically accurate load-bearing strength—with a safety factor for overloads.

Add to this, concrete's life expectancy of 50 years and more, with far lower maintenance costs. Add "thump-free" smoothness that

pleases the public . . . and the all-weather safety the grainy surface gives. On Interstate and all heavy-duty highways, modern concrete puts quality within your budget.



Concrete gains strength year by year—up to 20% in the first 5 years. Tests of flexural strength prove that only concrete gives this load-bearing "bonus."

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

... for more details circle 296 on enclosed return postal card

Before you bid that next job . . .

compare the earning power of "Twins"

Unless your equipment can help you increase production — without a corresponding increase in costs — you may have a problem instead of a profit on your next job.

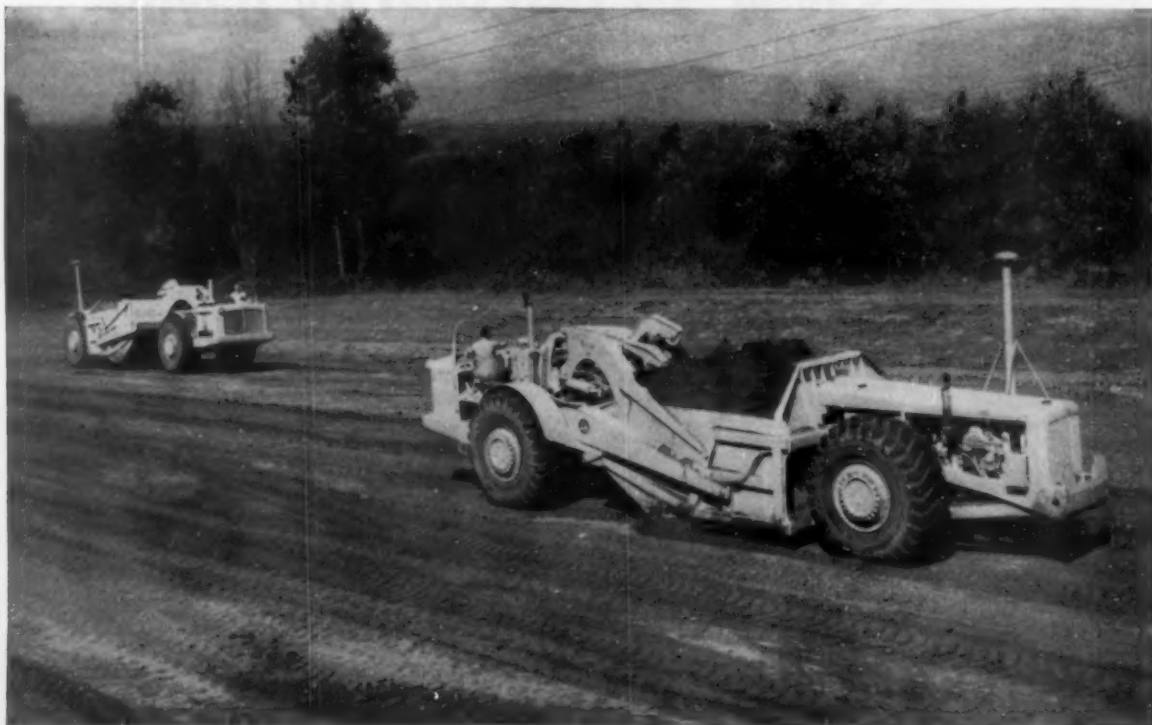
There's one sure-fire way to increase productivity — use the latest methods and the most efficient equipment available for the job,

even if it means replacement or addition to your fleet. To stay competitive and still get your share of work — at a price that brings a profit — you simply can't afford to pass up the higher return on investment with new techniques and machines. Here's a typical comparison . . .

On an investment of \$255,000 . . . 38% gross return

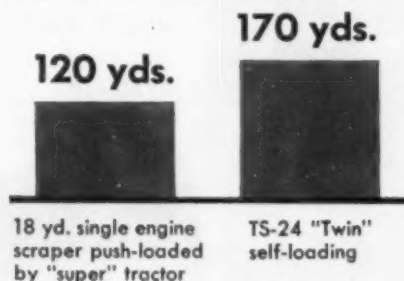
Suppose you have a spread of three 18 yd. single engine scrapers working on a 2,000' haul. They're push loaded by a 300 h.p. "super" tractor and you're also using a motorgrader and 200 h.p. dozer and roller. Conditions are average (7% rolling resistance) so your scrapers produce about 360 yds. per hour. Total investment for the entire spread would be about

\$255,000 — an hourly cost of \$77.30. That figures out to 21.5c a yd. Assuming a work season of 2,000 hours, you'd have a total production of 720,000 yds. At an average bid price of 35c a yd., gross revenue would amount to \$252,000 and your dirt moving cost would total \$154,800. The return is 38% on the equipment investment.



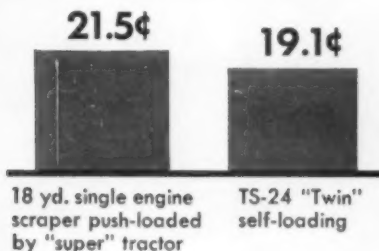
HOURLY PRODUCTION

2000' haul—average conditions, 7% rolling resistance—50 minute working hour



COST PER YARD

2000' haul—average conditions, 7% rolling resistance—50 minute working hour



16% lower investment . . . 33% higher return

Now, let's say you put two Euclid TS-24 "Twin" Scrapers on the same job and use the same grader and dozer. With the "Twins" self-loading in the average condition, a reasonable estimate of production would be a total of 340 yds. an hour. Total investment, with dozer, roller and grader, would be \$214,000. Hourly cost of the complete spread would be \$65.00, with a cost per yard of 19.1¢. Season production of 680,000 yds. would produce

gross income of \$238,000 at 35¢ a yard. Your dirt cost of \$129,880 would result in a 51% return on the equipment investment.

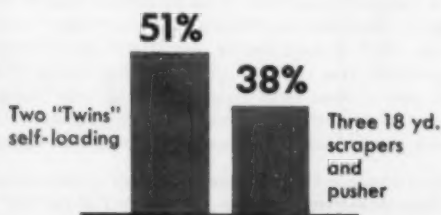
The figures in the above comparison may not jibe with your cost figures but they're down-to-earth estimates of the built-in productivity of the "Twin". Based on your own experience, use production and cost figures that you're sure of and you'll find that Euclid "Twins" will give a tremendous bidding and profit advantage on any size and kind of job.

And don't overlook the bonus performance of the TS-24 that doesn't show in specs or calculations. For example, it's self-loading and independent of other equipment for pioneering work and small yardage jobs . . . it has all wheel drive that enables it to work earlier and later in the season, under conditions that keep other scrapers sidelined. And when you're really pressed for time and yardage, you can add a pusher tractor to get almost unbelievable hourly production.

With "Twins" in your fleet you can bid more work, more profitably and realize the highest return on investment. For facts and figures proof, and a demonstration on your job, see or call your Euclid dealer.

RETURN ON INVESTMENT

Comparative return on investment—3 single engine 18 yd. scrapers with "super" pusher versus 2 Model TS-24 "Twins" self-loading



Engineered to fit the job . . .
Euclids are your best investment



EUCLID DIVISION

General Motors Corporation
Cleveland 17, Ohio



HYDRA-
BOOM
DRILLS

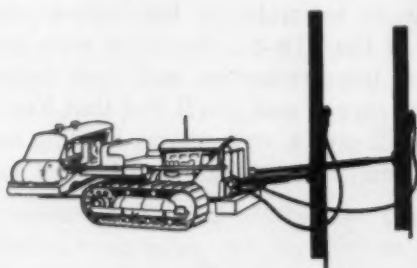


TRACTOR
OR
TRUCK



GYRO-FLO
COMPRESSOR

*put them together
and you have
a time-saving
labor-saving*



Hydra-Boom

DRILLING RIG

Here's a rugged, self-powered and self-propelled drilling rig that will increase production, cut drilling costs and convert setup time into *drilling time* on any rock excavation job.

With two I-R Hydra-Boom mounted X71-WD Drifters, you can spot holes on a dime and set up to drill in *any position* at the touch of a throttle. Hydra-Booms lift, tilt, extend, retract, dump and swing by smooth, hydraulic power. Operators spend time *drilling rock*—not lugging heavy equipment over rough ground. On job after job, Hydra-Boom Drilling Rigs have doubled production per shift and cut total cost per foot of hole by 50% or more.

Hydra-Booms are big and rugged, with larger, more powerful cylinders that work at lower pressure, hold better, eliminate creeping and require less maintenance. Safety-lock check valves prevent booms from creeping or dropping.

The 600 cfm Gyro-Flo rotary compressor provides ample air power to run both drills simultaneously at top efficiency. And because it has no pistons, rings, valves, rods or clutch, it requires far less attention and maintenance than other types of portable compressors. With the air power plant right on the same rig, hose connections are short and always out of the way, eliminating air hose breaks due to freezing, blasting or collisions.

For the complete Hydra-Boom story, see your nearest I-R representative, or write to Ingersoll-Rand for a copy of new Bulletin No. 4196



Ingersoll-Rand
5-846 11 Broadway, New York 4, N. Y.

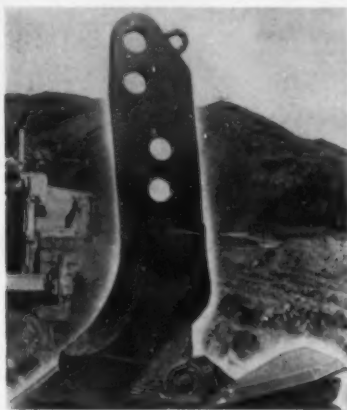
A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK
... for more details circle 282 on enclosed return postal card

New Products

Heavy Duty Ripping Tool

A new type heavy duty ripping device, announced by Double J. Breaker Co., is claimed to dig in and to stay down in tough rock. One of its features is the breaker plate, a heat-treated steel wedge 22 in. wide, weighing approximately 140 lb, and attached to the rear of the shank in a horizontal position. The plate works on the same principle as a log-splitting wedge, in this case greatly expanding the fractures in the stratum to the right and left of the shank and in front of the ripper point, at the same time lifting ripped material upward.

Double J. Breaker Co., Inc., 3484 East Gage Ave., Bell, Calif.



Heavy Duty Ripping Tool

For more details circle 101 on Enclosed Return Postal Card.

Non-Stop Truck Scale

A system for weighing axle-loads of a moving truck has been developed by Truck Scale and Research Corp. With this method employing a direct-reading dial, only a driver is necessary and he need never leave the cab.

The base of the system is the "Quick-Way" scale, employing hydraulics to consistently and accurately indicate legal or illegal axle-load weights. A reinforced steel beam tread replaces the



Non-Stop Hydraulic Truck Scale

(Continued on page 106)

LOVES A TOUGH JOB!

BMCO'S SELF PROPELLED ROLLER



MODEL SPR-9

All wheels oscillate on this exclusive BMCO design... giving more perfect compaction. It is impossible to overload any one tire! All wheels act independently... each bearing its share of the load. Four speeds forward—Four speeds reverse.

MODEL SPR-9B

The same specifications as the SPR-9, except: a smaller power unit and heavy duty industrial type clutch... however, this power unit is still more powerful than all others in its class... same 4 speeds forward... same everything as in the "deluxe" model, but approximately \$1,000 less.

OTHER QUALITY ITEMS IN THE BMCO LINE:



PNEUMATIC ROLLERS



ROCKBUSTER



50 TON COMPACTORS



SHEEPSFOOT ROLLERS



VIBRATING ROLLERS



For Further Information,
Phone, Write or Wire

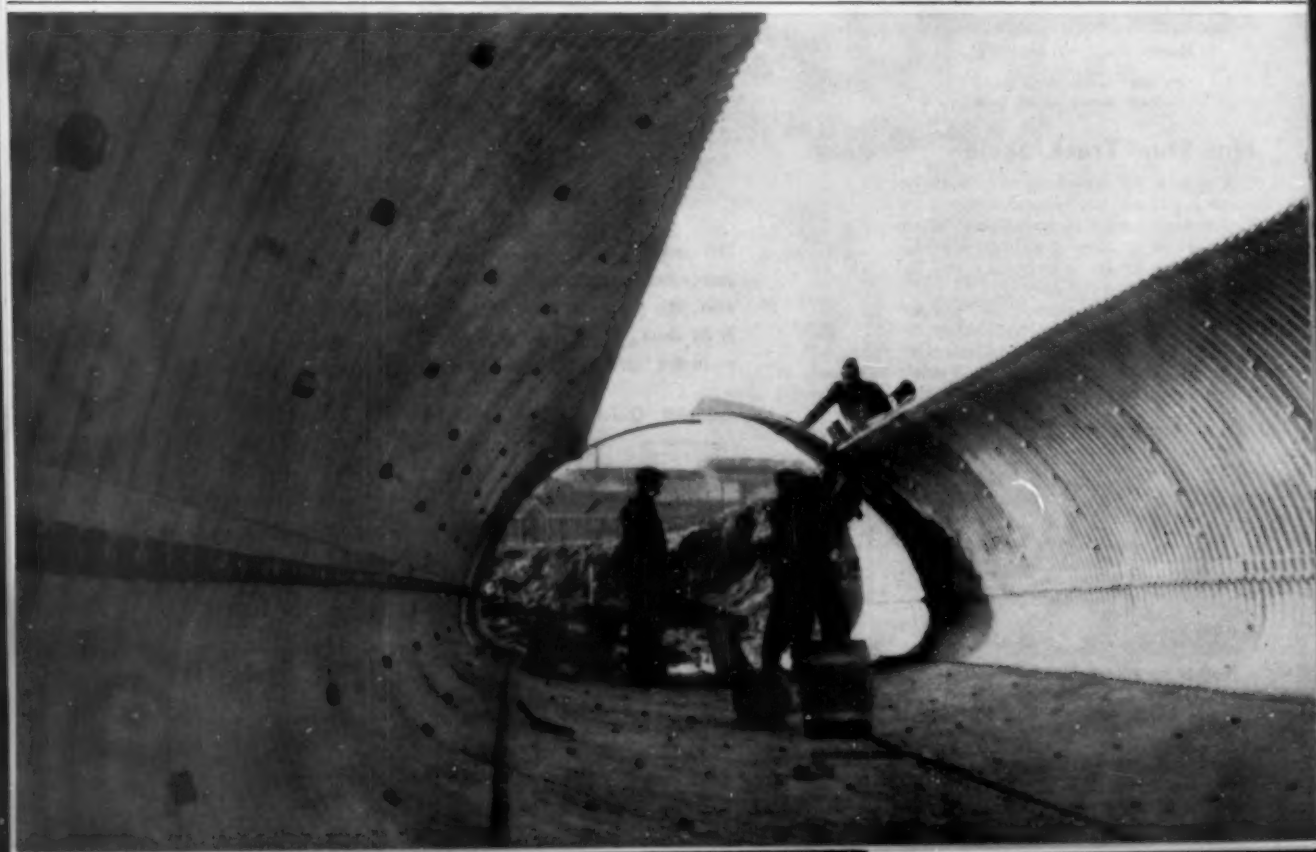
BROWNING MANUFACTURING CO.

111 HUMBLE AVE. • P.O. BOX 2707
WALnut 3-4331 • SAN ANTONIO, TEXAS

... for more details circle 244 on enclosed return postal card



American Bridge helps you
build more road for the money!



These Structures were furnished to Prince Georges County, Maryland—John H. Marburger, Jr., Administrator of Public Works—by Lane-Penncarva, Inc., Bealeton, Virginia.

Twin Beds for Winkledoodle

... or a quick, low-cost way to remove a roadblock

Winkledoodle is a quiet little creek which runs through a real estate development in the Maryland suburbs of Washington.

But sometimes even an innocent-looking stream like Winkledoodle becomes a headache when it blocks progress by dead-ending a street which ought not to be dead-ended. Solving such a problem is less difficult than you might think, as you can see from the experience of the Department of Public Works of Prince Georges County, Maryland.

Serving as giant twin-covered beds for Winkledoodle, long pipe-arch drainage structures shown here were made of USS AmBridge Sectional Plate. They each have a 12'6" span, a 7'11" rise, and are 112' long. Each was erected in the bed of the temporarily diverted stream in just *five working days* by a five-man crew, plus crane.

Job Superintendent says:
"They went together easier
than any in my experience."

The dimensional accuracy of prefabricated USS AmBridge Sectional Plate Pipe, Pipe-Arches and Arches assures precision fit in the field. In fact, Arthur Richards, Bridge Superintendent, enthusiastically says that the Winkledoodle drainage structures went together easier than any in his experience. Mr. Richards particularly noted that all of the bolts fitted readily. He was also impressed with the uniform curvature of the interchangeable plates.

No forms needed... no breakage

USS AmBridge Sectional Plate Pipe, Pipe-Arches and Arches eliminate the need for forms. And, being made of steel, there is no breakage. They are permanent. And they can be extended whenever the road is widened. Fabricated to meet all federal and state specifications, they are available in a complete range of standard sizes to satisfy the design

requirements for area of waterway openings.

For a free copy of our 28-page AmBridge Sectional Plate Catalog, write direct to our Pittsburgh Office. For information on smaller drainage structures made from USS Galvanized Corrugated Culvert Sheets, please send your inquiry to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS and AmBridge are registered trademarks

**American Bridge
Division of**



United States Steel

General Offices: 525 William Penn Place, Pittsburgh, Pa.
Contracting Offices in: Ambridge · Atlanta · Baltimore · Birmingham · Boston · Chicago · Cincinnati · Cleveland · Dallas · Denver · Detroit · Elmira · Gary · Houston · Los Angeles · Memphis · Minneapolis · New York · Orange, Texas · Philadelphia · Pittsburgh · Portland, Ore. · Roanoke · St. Louis · San Francisco · Trenton · United States Steel Export Company, New York

... for more details circle 236 on enclosed return postal card

New Products

(Continued from page 103)

conventional platform. Then being hydraulic, "Quick-Way" requires no pit to accommodate beams and levers. These features allow the entire device to be installed in an 11½-in. deep recess in a concrete driveway to form simple, rugged weighing facilities.

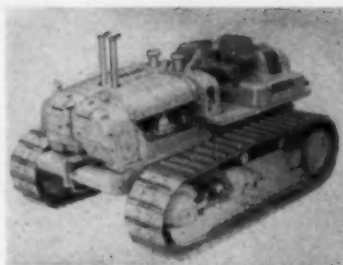
Truck Scale and Research Corporation, 1415 Third St. South, P. O. Box 1047, St. Petersburg, Fla.

For more details circle 102 on Enclosed Return Postal Card.

Crawler Tractor

A number of improvements in Model TC-12 tractor have been announced by Euclid Division, General Motors Corporation. This "Twin" crawler features 402 net horsepower delivered to the power train, two "Torqmatic" drives with independent planetary track drives, no steering clutches, 8 roller track frames, rear mounted cooling system, in-seat starting, fully automatic hydraulic track recoil adjustment, and unitized assemblies.

Heavier construction and more rugged components throughout have



Model TC-12 Crawler Tractor

increased the bare weight of the tractor from 64,000 to 67,000 lb. plus.

Euclid Division, General Motors Corporation, Cleveland 17, Ohio.

For more details circle 103 on Enclosed Return Postal Card.

Model 3/8-Yd. "Hopto"

A new and improved carrier-mounted ¾-yd. Model 200 "Hopto", announced by The Warner and Swasey Co., is stated to be able to travel on the highway at speeds up to 50 miles per hour.

This earth-moving machine is manufactured by the Badger Division in Winona, Minn., and is mounted on a motorized carrier designed and manufactured especially for this "Hopto" model by the Duplex Division of The Warner & Swasey Co. The carrier has

a 16,000-GVW rating and a 124-in. wheelbase. It is powered by a 265-cu. in. displacement engine and has a 225-ft.-lb. torque at 1200 rpm.

The "Hopto" 200 digs to a depth of 13½ ft. It has a full range of quick change attachments, including both backhoe and shovel buckets.

The Warner and Swasey Co., 5701 Carnegie Ave., Cleveland, Ohio.

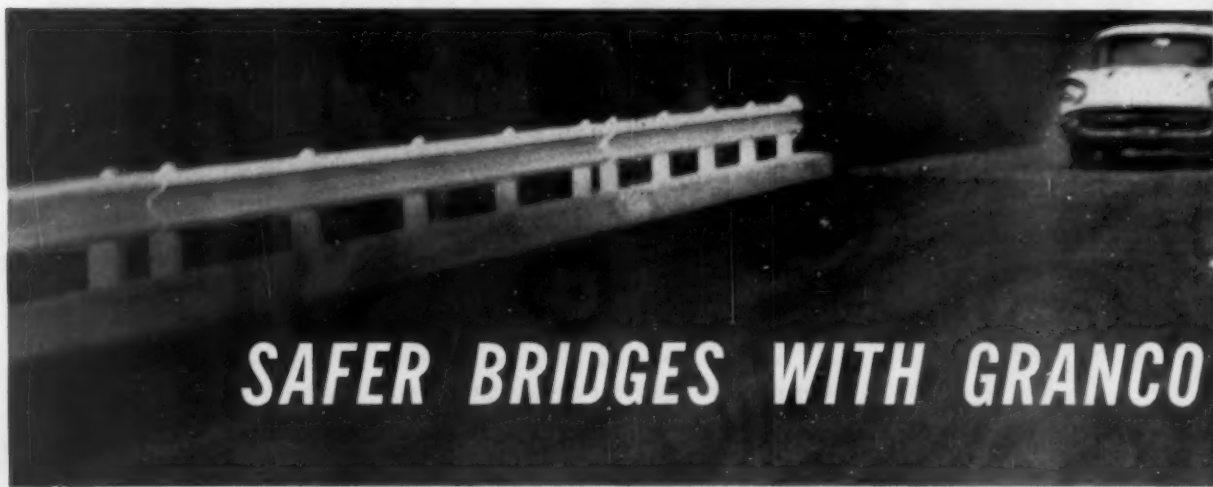
For more details circle 104 on Enclosed Return Postal Card.



¾-yd. Model 200 "Hopto"

Concrete Vibrators

Two new, lightweight electric motor-in-head concrete vibrators have been announced by Vibro-Plus Products, Inc. Model AEH-45 weighs 14 lb., has a head diameter of 1¾ in. and operates at 15,000 vpm. Model AEH-65 weighs 24 lb., has a head diameter of 2¾ in. and also operates at 15,000 vpm. The



SAFER BRIDGES WITH GRANCO

HELP PROTECT MOTORISTS! Give them a safer, wider approach! Utilize the full roadway and protect the bridge structure at the same time—with Granco Deep-Beam Guard Rail.

HIGH-STRENGTH VISUAL BARRIER! Granco Guard Rail acts as a continuous impact-resistant beam. Collision forces are absorbed by posts on both

sides of the point of contact. Wide beam is easy to see, day or night.

STANDARD SECTIONS! Interchangeable units, as adopted by the American Association of State Highway Officials, assures easy installation or replacement of Granco Guard Rail. Erection bolts, nuts and washers are furnished with rail sections.

SAFER HIGHWAYS, TOO! Granco Guard Rail reduces serious accidents and road hogging, deflects cars along roadway, will not trap them in a collapsing pocket.





Model AEH Vibrator

Universal motor operates from any standard 115v-60 cycle outlet. The unit can be handled easily by one man. Both models are available in 7, 14 and 21-ft. lengths. 25 ft. of cable is supplied with each unit to give extra working radius.

Vibro-Plus Products, Inc., Stanhope, N. J.

For more details circle 105 on Enclosed Return Postal Card.

Bushed Arbor Holes

A friction-reducing metal bushing in the arbor holes of reels for prestress strand has been developed by Leschen Wire Rope Division, H. K. Porter Co., Inc. Designed to overcome two common problems frequently encountered by manufacturers of prestressed concrete units, the bushing assures that the

roundness of the arbor hole will be maintained throughout the unreeling process. This eliminates the need for extra pulling force to turn the reel when an unfinished hole gets out of round. By reducing friction on the shaft, the bushing also permits exceptionally easy unreeling.

Leschen Wire Rope Division, 2727 Hamilton Ave., St. Louis 12, Mo.

For more details circle 106 on Enclosed Return Postal Card.



FWD Axle 8x4 Carrier

Crane Carriers

A new series of FWD double tandem rubber-tired crane carriers has been announced for commercial crane and shovel manufacturers. The illustration shows a four-axle 8x4 carrier with driving rear tandem. The new series

also includes 8x6 carriers of similar design, with front axle of front tandem and both axles of rear tandem driving.

Four Wheel Drive Auto Co., Clintonville, Wis.

For more details circle 107 on Enclosed Return Postal Card.

Surveying Instruments

Two new surveying instruments, introduced by David White Instrument Co., are said to represent the first major improvement in 50 years. They are the 8007 light construction and farm level-transit, and the 8025 light construction and farm level.

The 8007 is a simple and complete combination instrument for leveling and transit work from the same set-up. The 8025 is a precision-built level, featuring interval focusing.

David White Instrument Co., 2051 North 19th St., Milwaukee 5, Wis.

For more details circle 108 on Enclosed Return Postal Card.

More new products
beginning on
pages 109, 131

DEEP-BEAM GUARD RAIL

Beam strength and height prevent cars from hurdling over or going under rail. Modern, flared end-sections help prevent cars from hitting rail head-on.

AVAILABLE NOW! 10 or 12 gage for bridge rail and 12 gage for highway rail. Granco Guard Rail is available through distributors in principal cities.



A Subsidiary of
GRANITE CITY STEEL CO.



SEND FOR NEW GUARD RAIL PRODUCT MANUAL

Eight pages of application photos, standard drawings, specifications, curving data, installation instructions and facts on non-highway use. Write Granco address shown at left. ATTENTION: Department RS-82.

Name _____
Firm _____
Address _____
City _____ State _____

... for more details circle 271 on enclosed return postal card

ROADS AND STREETS, July, 1958

CONTINUOUS RESEARCH AT CATERPILLAR LABORATORIES IS EXTENDING ENGINE LIFE THOUSANDS OF HOURS

EXAMPLE: Lube oil filter elements that give greater protection
for longer periods at less cost

The development of new, additive lubricating oils has reduced oil change requirements. Cat filters have kept pace with these improvements. Cat filters have greater *dirt-holding capacity* to filter efficiently over the entire *extended* periods. This means a big saving to every owner of Caterpillar equipment.

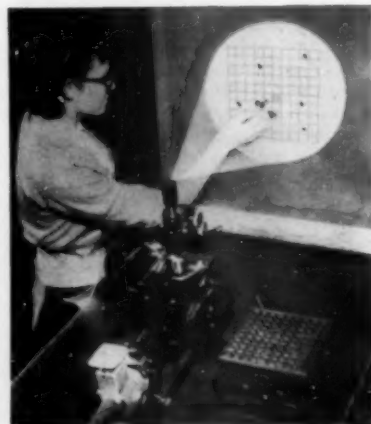


FILTER TEST STAND adds controlled amounts of dirt to lube oil to check how much dirt an element can hold before plugging. Unless this is determined, replacement recommendations cannot be made. Of all the filter makes tested, only Cat filters completely met Cat Engine requirements.

Most oil filters of other makes fall far short of meeting Cat filter replacement recommendations—usually because they have *insufficient* dirt-holding capacity (not enough filtering paper) or they filter harmless, too-fine particles which quickly load up the element, opening the safety bypass. As a result, unfiltered oil is allowed to circulate, causing rapid, premature wear.

You can't get maximum engine life unless you filter *full time*. The best way to insure long engine life, peak performance and operating economy is to standardize on Caterpillar oil filters. They are the only filters you can count on to give full-time protection over the entire filter change period that is recommended for your Caterpillar Engine. See your nearby Caterpillar Dealer today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



PROJECTION MICROSCOPE magnifies 500 times particles that pass through filter paper so they can be measured. Since precision bearings ride on an oil film, particles smaller than the oil film can cause no measurable wear even after thousands of operating hours. Too-fine filtering shortens filter life needlessly.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

This contractor saved \$1,822.24 in one year in oil changes

SERVICE TIP

Complete information on oil changes is provided in Form 32421-1, *Crankcase Lubricating Oil Change Period Recommendations*, available from your Caterpillar Dealer. These recommendations are tested and proven. When used with Cat filter elements, you'll get maximum protection for your equipment at the lowest cost.

Many Caterpillar owners tend to play it safe by changing lube oil and filter elements far more frequently than recommended; thus they are willing to gamble on lower-priced, small-capacity

filter elements. This is false economy. Here is an actual experience of a contractor, owner of eight Caterpillar D8 Tractors, who followed recommended procedure with Cat filters:

Past Procedure — Oil changed every 80 hours

Lube oil @ \$1.25 per gal.	
9 gal. per change	\$11.25
filters @ \$1.00 ea.	
3 per oil change	3.00
Labor cost	2.50
Total cost per change	\$16.75
Ave. operating hours per year	2,400
Ave. oil changes per year	30
Total cost per machine per year	\$502.50
Total cost for eight D8s	\$4,020.00

Cat Recommended Procedure — Oil changed every 150 hours

Lube oil @ \$1.25 per gal.	
9 gal. per change	\$11.25
Caterpillar filters @ \$1.14 ea.	
3 per oil change	3.42
Labor cost	2.50
Total cost per change	\$17.17
Ave. operating hours per year	2,400
Ave. oil changes per year	16
Total cost per machine per year	\$274.72
Total cost for eight D8s	\$2,197.76

D8s — 2U, 14A and 15A Series Tractors • Lubricating oil used: Series III • Fuel sulphur content: .4% to 1.0%

... for more details circle 251 on enclosed return postal card

New Products

Reader Service Numbers on Enclosed Postcard
More products beginning pages 103, 131



Model CW Continental—Wooldridge Self-Propelled Scraper

Self-Propelled Scraper

A new Model CW 215, added to the Continental-Wooldridge scraper line, has a truck capacity of 15 cu. yd. (21 cu. yd. heaped) and is stated to be capable of hauling 21 tons payloads at speeds in excess of 31 mph.

Powered by a 240-hp Cummins diesel engine, with a 10-speed forward and two-speed reverse transmission, the CW 215 incorporates Continental-Wooldridge "Rotogear" positive steering. Fast, easy loading in all types of materials is accomplished by boiling-bowl loading, adjustable angle cutting edge, and long profile bowl design. The air-operated power control unit is "live" at all times.

Another outstanding feature of the CW 215 is its interchangeability with the CWD 214, 25-ton rear dumper, which permits use of the same tractor for either unit.

Continental Copper and Steel Industries, Inc., Wooldridge Division, Sunnydale, Calif.

For more details circle 109 on
Enclosed Return Postal Card.

11 1/2-Cubic-Yard Scraper

An 11.5-cu. yd. scraper, the DT "Fullpak" model, for use with tractors of 70 hp or more has been added to the LeTourneau-Westinghouse Company line. Design features and operational characteristics are the same as on the other "Fullpak" models. The bowl floor

which provides approximately 28 sq. ft. of load base, measures only 40 in. from the tip edge of the cutting blade to the face of the tailgate, minimizing the distance material must travel to get into the bowl.

The DT's 8 ft. 4 in. three section blade is angled precisely with the floor of the bowl to reduce loading resistance. With only a one-degree floor tilt, the scraper bottom remains nearly flat in the loading position so material need not be forced "up-hill" to get into the bowl. The scraper's rear wheels are set well within blade width for maximum controllability in making accurate cuts.

LeTourneau-Westinghouse Co., Peoria, Ill.

For more details circle 110 on
Enclosed Return Postal Card.

1 1/2-Yard Hoe-Shovel

An all-hydraulic combination hoe-shovel has been introduced by Bucyrus-

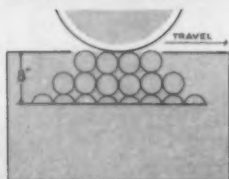


"DT Fullpak" Scraper in Action



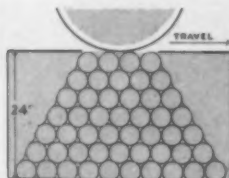
H-5 "Hydrohoe-Hydroshovel" Equipped as Hoe Only

TERRAPAC WINS ANOTHER JOB AGAINST 50-TON ROLLER



CONVENTIONAL STATIC COMPACTION

Static rollers, relying on weight alone, produce friction forces between soil particles causing bridges to form. Terrapacs break bridges for deep compaction.



TERRAPAC DYNAMIC COMPACTION

Vibratory energy breaks frictional forces binding soil particles together, allows soil to sift down producing uniform densities at greater depths.

12 CH-30 Vibratory Rollers Tame 8,000,000 Yards on Griffiss Air Force Base

Once again the Terrapac way of compaction has made a name for itself, this time on the Griffiss Air Force Base in Rome, New York where the contractor compacted 7000 yards a day achieving 97, 98, 101 and 103 percent modified AAHSO density respectively in 2, 4, 6 and 8 passes . . . Moreover, this desired density was often obtained with lifts up to 15 in. compacted thickness (6 in. with 12 in. maximum specified) . . . This site consisted almost entirely of sandy silt, ranging from fine to coarse, with traces of clay usually in thin laminations . . . As a result of this showing, 12 Terrapac CH-30 vibratory rollers were picked as chief compaction tools . . . Contact your local Vibro-Plus distributor, let him arrange a Terrapac demonstration, and, if desired, supply you with complete details on the above job.

41-51



VIBRO-PLUS PRODUCTS, Inc.

STANHOPE, NEW JERSEY

WORLD'S LEADING MANUFACTURER OF VIBRATORY EQUIPMENT FOR OVER TWO DECADES!

. . . for more details circle 318 on enclosed return postal card

110

ROADS AND STREETS, July, 1958

HUBER-WARCO

tandem rollers

Eric Co. It is the $\frac{1}{2}$ -cu. yd. H-5" Hydrohoe-Hydroshovel. It mounts on any new or used suitable commercial truck.

The new unit is available as "hoe only," without basic crane or hoist machinery, or it can be made so as to allow quick field conversion to crane or clamshell work. It has three hydraulic circuits, each supplied by a separate pump, providing 90 hydraulic horsepower. Differential and selector valves allow the operator to concentrate the H-5's horsepower where and when it is needed.

A total of 18,000 lb. of ram force is provided by the combination of crowd-down, dig and wrist action rams. A dipper-wrist action ram generates as much as 10 tons of digging force at the dipper lip.

Boom telescopes up to 4 ft., reducing the need for truck move-ups and making it easy to spot the depth accurately.

Bucyrus-Erie Co., South Milwaukee, Wis.

For more details circle 111 on Enclosed Return Postal Card.



Clamshell Attachment on Swing Loader

Clamshell Attachment

A new clamshell attachment, with five bucket widths, for its "Speed Swing" loader, has been announced by Pettibone Mulliken. Maximum digging height is 9 ft.; maximum digging depth 10 ft. Buckets for digging rock and dirt are available in 18 and 24-in. widths; for handling light materials, such as slag and coal, there are 30 and 36-in. buckets; 60-in. buckets for handling rubbish and snow are also available.

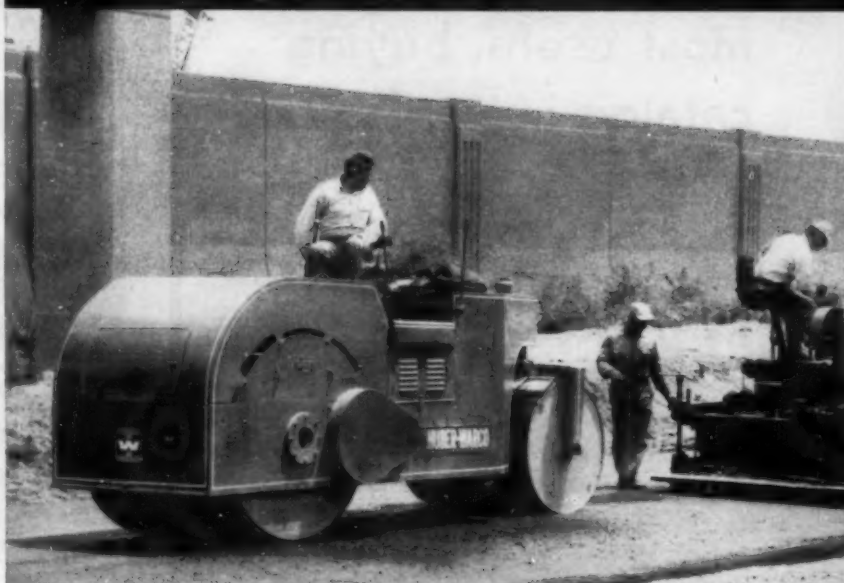
Pettibone Mulliken Corporation, 4700 W. Division St., Chicago 51, Ill.

For more details circle 112 on Enclosed Return Postal Card.

Portable Generator Set

A portable lightweight generator set developing 35,000 watts has been added to the line of power producing equipment of Allis-Chalmers. Its "heart" is the "Power-Crate" engine manufactured by Allis-Chalmers. The unit provides either continuous or standby power.

Known as the "G-226", the new set is complete as a package, with all controls and accessories needed for immediate use. Because it is completely



smooth, positive rolling action

Huber-Warco medium and large size TANDEM ROLLERS offer a torque converter, tail-shaft governor and 2-speed transmission for a new ease of operation and smooth roller performance. The operator sets the speed and it is maintained automatically, regardless of grade encountered. Models range from 5-8 to 10-14 ton. A 3-5 ton model with torque converter and water-cooled engine is also available. See your Huber-Warco distributor for complete details.



MOTOR GRADERS



TANDEM ROLLERS



3-WHEEL ROLLERS



MAINTAINER

Products of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

... for more details circle 276 on enclosed return postal card

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

☐ Send specifications on Huber-Warco tandem rollers.

Send specifications on: ☐ Maintainer

☐ Motor Graders ☐ 3-Wheel Rollers

Name

Title

Company

Address

City Zone State



here . . . without a doubt . . . is the most useful buying catalog in your office

. . . and here are some reasons why you should be USING IT DAILY!

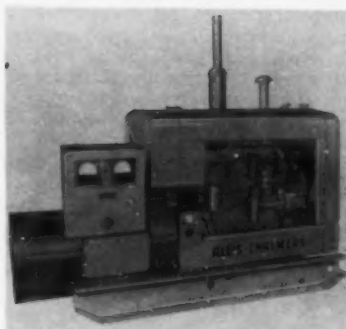
- Catalogs are PREFILED — Saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
- Gives you all the facts needed BEFORE you make a buying decision.
- Manufacturers' names and trade names indexed alphabetically for quick reference to individual catalogs.
- All the buying information is 'boiled down' — designed for your convenience.

After checking the advantages listed above, you can see why this ONE CATALOG offers you so MANY advantages . . . saving you both time and money, not only in the mechanical and physical aspects of a cataloging operation . . . BUT MOST IMPORTANT OF ALL . . . it is available WHEN you NEED it . . . BEFORE you make your buying decisions! The manufacturers represented in this catalog are literally 'meeting' with you in your office — offering you all the information you could possibly need concerning their products. Why not meet them at least half way — and USE THEIR PREFILED INFORMATION!



Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

American Steel & Wire	Jackson Vibrators, Inc.
Armco Drainage & Metal Products, Inc.	Jay Manufacturing Company
Austin-Western	Miller-Tilt-Top Trailer Company
Baldwin-Lima-Hamilton Corporation	Minneapolis-Moline Company
Barber-Greene Company	Naugatuck Chemical Div.
Browning Manufacturing Company	Onan & Sons, Inc., D. W.
Corey Manufacturing Company, The Phillip	Owen Bucket Company, The
Chrysler Corporation, Industrial Engine Div.	Phoenix Products Company
Clark Industries	Pioneer Engineering
Cleaver-Brooks Company	Preslitz-Keystone Company
Cleveland Farm Grader Co., The	Republic Steel Corporation
Cleveland Trencher Co., The	Rogers Brothers Corporation
Colorado Fuel & Iron Corp., The	Rogers Dozer Rippers
Continental Motors Corporation	Seaman-Andwall Corporation
Cummer & Son Co., The F. D.	Seamon-Gunnison Corporation
Detroit Diesel Engine Div.	Servicised Products Corp.
Erie Strayer Company	Shawnee Mfg. Co., Inc.
Flexible Road Joint Co., The	Stow Manufacturing Co.
Gar-Bro Manufacturing Co.	Symons Clamp & Manufacturing Co.
General Motors Corp.	Timken Roller Bearing Co., The
Gladhill Road Machinery Company, The	Toncan Culvert Manufacturers Association
Harnischfeger Corporation	United States Rubber Company
Heltzel Steel Form & Iron Co., The	United States Steel Corp.
Hube-Warco Company, The	Universal Form Clamp Company
	Waukesha Motor Company
	Williams Form Engineering Corp.



Model W-226 Generator Set

weatherized, it can be used either outdoors or indoors. The switchboard and instrument panel are protected against weather, dirt and tampering by a completely enclosed cabinet with a glass door that can be locked. It can be operated either by gas or gasoline.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

For more details circle 113 on Enclosed Return Postal Card.

Large Runway Vac Cleaner

For the cleaning of runways used by jet-powered aircraft, where stones, metal pieces, and other engine-damaging articles pose a special problem, Wayne Manufacturing Co. has acquired rights to manufacture the "Schorling Suction Runway Sweeper" of the Schorling Waggonbau of Hanover, Germany. The machine will be sold in the United States and Canada as the "Wayne Hi-Speed Vacuum Sweeper."

The new sweeper employs a low pressure, high volume suction principle in addition to an exclusive nylon agitator system that has been proven most highly efficient. It is now in use by the United States Army Air Force and 22 other nations. It is said to clean approximately 1,000,000 sq. ft. per hour with sweeping speeds up to 25 miles per hour. Wayne states that it will make this sweeper available for all aircraft needs on a rental basis, a system which has proven highly successful in the company's street sweeper program.

Wayne Manufacturing Co., 1201 East Lexington Ave., Pomona, Calif.



"Wayne Hi-Speed Vacuum Sweeper"

For more details circle 114 on Enclosed Return Postal Card.

HUBER-WARCO

motor graders



bank sloping made easy

Exclusive with Huber-Warco MOTOR GRADERS is the complete hydraulic cab-controlled blade movement. In less than a minute, and without ever leaving the cab, the operator can move the blade from a 90° bank sloping position on one side to 90° on the other. There are NO manual adjustments to be made. This bonus feature is on all Huber-Warco torque converter and standard transmission MOTOR GRADERS ranging in horsepower from 75 to 195 h.p. Get all the important facts . . . contact your Huber-Warco distributor today.



MAINTAINER



MOTOR GRADERS



TANDEM ROLLERS



3-WHEEL ROLLERS

Products of HUBER-WARCO COMPANY, Marion, Ohio, U. S. A.

. . . for more details circle 277 on enclosed return postal card

HUBER-WARCO COMPANY, Marion, Ohio, U.S.A.

☐ Send specifications on Huber-Warco motor graders.

Send specifications on: ☐ Maintainer
☐ Tandem Roller ☐ 3-Wheel Roller

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

7-RS





The 995 GM "Lugmatic", heaviest and most powerful tractor ever produced by Oliver, is shown working with the new 998—1½-yard loader in the test field at Cleveland plant.

New Wheel Tractors

A complete new line of industrial wheel tractors has been announced by The Oliver Corporation. Range is from the Models 550, (35 hp) available with either gas or diesel engine, to the big 995 GM "Lugmatic" diesel (90 hp) with automatic torque converter. Other members of the line, designed to cover the entire power range needed by contractors, loggers, and other users, are the 770, (50-60 hp) 880, (64 hp, Nebraska test), 990 GM diesel, and the 950. All except the 990 and 995 are available with gasoline or diesel power.

The new tractors mount a wide range of equipment. All have been developed with many advanced features for economy and convenience.

The Oliver Corporation, 400 West Madison Street, Chicago 6, Ill.

For more details circle 115 on Enclosed Return Postal Card.

Big Compressor

What is believed to be the world's largest portable rotary air compressor is now available from the Le Roi Division of Westinghouse Air Brake Co. It is a twin-unit rated at 1200 cfm of free air compressed to 100 psi, and is designated "Le Roi 1200 RD 2". Fields of practical use include large tunnel jobs, pile driving, large-hole quarry drilling, four-drill pipeline rigs, multiple drill shaft jumbos, air drilling in the petroleum industry, or stand-by plant air.



Le Roi's "1200 RD2" Twin Compressor

Each unit has its own independent controls and can be operated separately for 600 cfm delivery or together for 1200 cfm. The capacity controls are arranged so that the units modulate either separately or simultaneously. This allows one unit to be stopped when air requirements are 600 cfm or lower, or when servicing, without complete interruption of job operation.

Sales Promotion Department, Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

For more details circle 116 on Enclosed Return Postal Card.

Hard Rock Tire

A new truck tire, specially designed for rock excavating, mine, and quarry work, is being marketed by The Goodyear Tire and Rubber Company.

Named the "Hard Rock Lug Xtra Tred", the tire is made with 3-T nylon cord and is "beefed up" with as much as 30% more rubber, by weight, in the tread. This extra heft of tread rubber is stated to enable the tire to wear longer despite cutting and bruising hazards prevalent in rock excavating, mining and quarrying operations.

The Goodyear Tire & Rubber Co., Akron, Ohio.

For more details circle 117 on Enclosed Return Postal Card.

Keep Cool, mister! with

ARCTIC BOY

portable water coolers



- Rugged Construction ... good everywhere men work!
- Galvanized inset, hot dipped after forming for flaw-free finish!
- Large top opening, easy to ice, fill and clean.
- Send for complete information and booklet "Care and Use of Your Cooler." Write Dept. C-43



THE SCHLUETER MFG. CO. • ST. LOUIS 7, MO.

... for more details circle 304 on enclosed return postal card

114

Cartridge Lubricants

Distribution of D-A Open Gear and D-A Lithium lubricants in cartridges, in addition to the conventional pails and drums, has been announced by D-A Lubricant Co., Inc.

The new cartridges offer three advantages: (1) They eliminate waste that occurs where lubricants in large containers are not completely consumed; (2) They prevent contamination from dirt since they remain completely sealed until ready for use; and (3) Through conveniences they save considerable time when loading grease guns and in application.

The D-A Lithium cartridge has removable ends. These are removed and the cartridge slipped into any standard grease gun.

D-A Lubricant Company, Inc., Indianapolis 23, Ind.

For more details circle 118 on Enclosed Return Postal Card.

New Chain Saws

Two new chain saws, a direct drive Model 7-19 and a gear drive Model 17-21, have just been announced by Homelite. Both saws carry a new 7 month guarantee. Lightweight, powerful, and carefully balanced, these saws are extremely easy to handle. They are designed for either full-time production cutting or part time work.

It is stated that the Model 7-19 will cut through 8-inch hardwood in 4 seconds and 18-inch softwood in 12 seconds. Straight blades in sizes 12 to 30 inches are available.

The gear drive Model 7-21 will cut trees up to 7 feet in diameter and speed through 20-inch trees in 18 seconds. Straight blades for the 7-21 are available from 14-in. to 60-in. sizes. Plunge cut bow and brushcutter attachments are available for both models.

Homelite, Port Chester, N.Y.

For more details circle 119 on Enclosed Return Postal Card.

ROADS AND STREETS, July, 1958

Heavy Duty Brush Rakes

Heavy duty brush rakes designed to speed land clearing are now available as an interchangeable attachment for Case "Terratrak" Model 800 and 1000 tractors and the new Model 1000 tractor shovel with rear hinged bucket. Fabricated of heavy steel plate welded into a single unit, the rakes can be used in place of moldboard on power-angling and power-tilting dozers, or in place of the shovel bucket, and are operated with the same hydraulic system. The ribs extend high above the frame to prevent brush from spilling over top and endangering tractor or operator.

J. I. Case Co., Racine, Wis.



Brush Rake, can be installed in place of either Power-Angling or Power-Tilt Dozer Blades

For more details circle 120 on Enclosed Return Postal Card.

Mobile Radio-telephone

A new RCA CWR-UIV-A four-frequency, mobile radio-telephone unit, that holds "busy" signals to a minimum, was designed primarily to permit the handling of a greater volume of on-the-road calls by industrial concerns, and in connection with telephone company construction and maintenance.

A multiple-frequency selector box, one of the unit's standard accessories, is mounted on the automobile or truck dashboard to enable the driver to switch to one of the three remaining channels when his regularly assigned frequency is "busy."

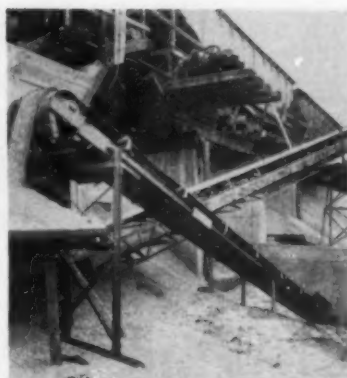
Communications Department, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N. Y.

For more details circle 121 on Enclosed Return Postal Card.

Transfer Conveyors

Barber-Greene's Model 375 "Transfer Conveyors" are now available in 18, 24 and 30-in. belt widths and in lengths ranging from 9 to 102 ft. in 1 ft. increments.

"Transfer Conveyors" are completely pre-engineered and pre-fabricated, designed for immediate job installation with an absolute minimum of on-the-job assembly of components. They are equipped throughout with ball-bearing, anti-friction carriers and return rolls. Each conveyor head-end incorporates a compact and efficient drive and pro-



Typical Barber-Greene "Transfer Conveyor" (Foreground)

vides an adjustment for length of the unit. Each tail end provides additional adjustment for belt tension and is equipped with a built-in loading hopper.

Barber-Greene Co., 400 No. Highland Ave., Aurora, Ill.

For more details circle 122 on Enclosed Return Postal Card.

Rubber-Tired Rollers

The Model RT-1100, an 11-wheel, towed-type rubber-tired roller has been added to the line of compaction rollers of Shovel Supply Co.

The outstanding feature of this machine is the specially-designed wheel oscillation, claimed to provide complete coverage on shoulder slopes as great as 2 to 1. This 11-wheel oscillator, empty, weighs 3630 lb and, when fully ballasted, exerts ground pressure of 306 lb. per inch of tire width. Timken tapered roller bearings with dust-proof seals are used in all wheels to assure long, efficient trouble-free service.

Shovel Supply Co., P. O. Box 1369, Dallas 21, Texas.



Model RT-1100 11-wheel Roller

For more details circle 123 on Enclosed Return Postal Card.

Trojan Tractor Shovel

The "Trojan-18", a new tractor shovel with six interchangeable buckets of 14, 16, 18, 20, 22, and 29 cu. ft. capacities has been placed in national distribution by the Contractors Machinery Division of the Yale and Towne Manufacturing Co.

(Continued on page 118)

TWIN FACTS



a report on the cost-cutting performance of Euclid "Twins"

"Downtime is negligible on the Twins..."

That's the report of Charles T. Sugden, a 34-year earthmoving veteran and co-owner of Sugden & Sivier. He was referring to the performance of six Euclid Twin-Power Scrapers on a recent 1,700,000 yard highway relocation job near Jackson, Michigan.



Water-logged sand pockets in the clay base plus unfavorable weather created the toughest dirtmoving conditions Sugden & Sivier had ever encountered. The spongy, rutted 3000 ft. haul had a 3% adverse grade and 17% rolling resistance for over half the distance. Yet, the "Twins" were able to stay on the job full time and pile up yardage that helped keep the earthmoving ahead of schedule. Even with these unfavorable conditions, each of the 518 h.p. all-wheel drive TS-24 "Eucs" was averaging 1500-1600 yards per 10-hour shift.

With their excellent job availability, unequalled power and traction and 32 yd. heaped capacity, "Twins" move the cheapest dirt!

EUCLID DIVISION, General Motors Corp., Cleveland 17, Ohio

... for more details circle 268 on enclosed return postal card

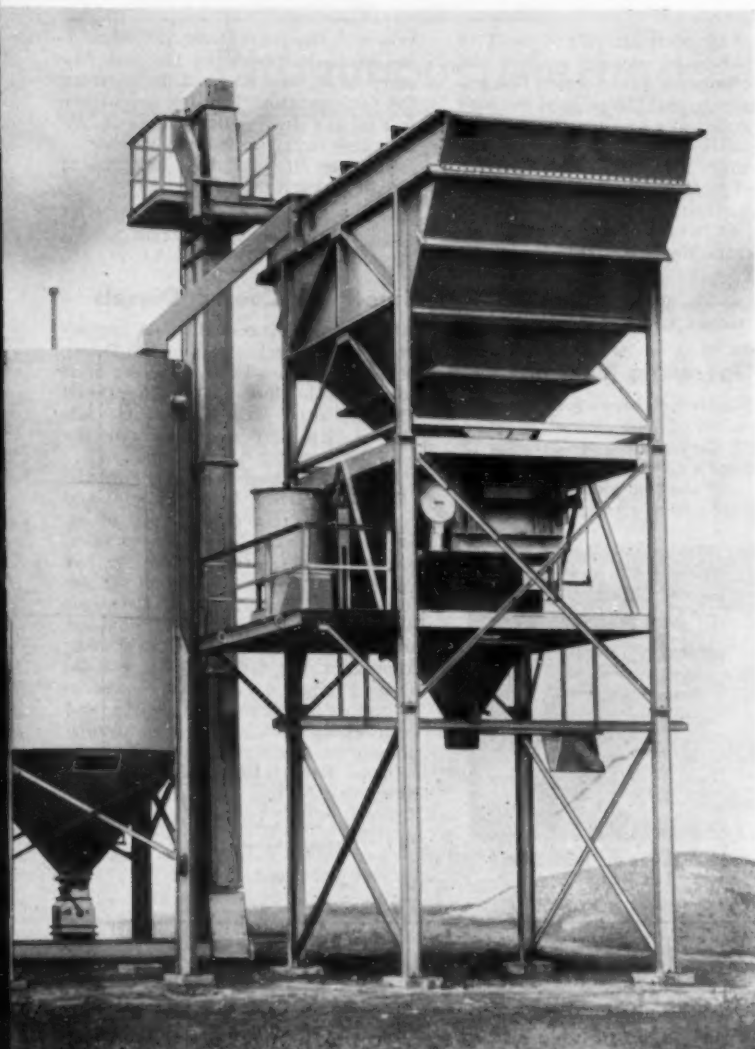
**This extra-portable new
Heltzel Unitized Batching Plant
sets up faster...combines dry
batch and truck mix**

.....



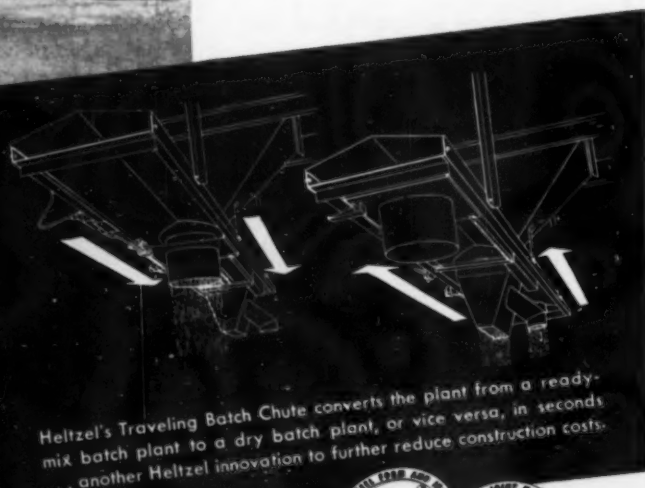
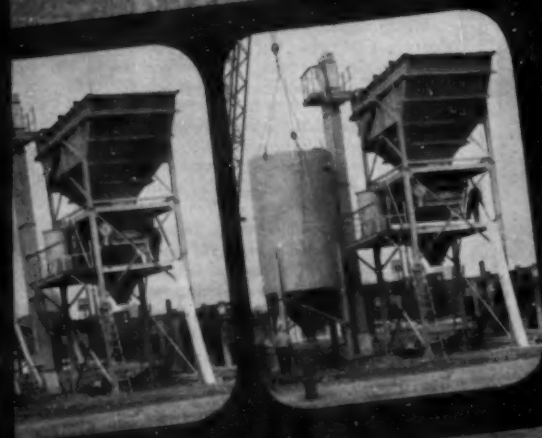
The eight photos in this strip give you the reason so many highway contractors are specifying Heltzel Unitized Batching Plants... speed and simplicity of set-up and dismantling.





Heltzel's new Unitized Plant goes together while you watch. It's the ultimate in portable batching equipment! The batching plant is factory assembled in three easy-to-handle sections that require only a minimum crew and standard crane equipment to set up. The factory assembled elevator comes as one complete unit that is easily set in place. The one-piece cement bin completes the basic assembly. For the first time an entire plant—batching section, storage and elevator sections—has been designed to give highway contractors a completely unitized, one-stop, truck mixer charging plant that is also well suited as a dry batch paving unit.

What's more, this is a Heltzel plant in every way. At no point in its design or construction did the engineers sacrifice Heltzel quality. In fact, because scales, batchers, etc., are factory assembled, it's exactly accurate and extremely fast—the finest engineered portable batching equipment developed to date. Make sure you have all the information on this time-saving packaged plant before you buy your next unit.



Heltzel's Traveling Batch Chute converts the plant from a ready-mix batch plant to a dry batch plant, or vice versa, in seconds... another Heltzel innovation to further reduce construction costs.



THE HELTZEL STEEL FORM AND IRON CO. WARREN, OHIO

... for more details circle 275 on enclosed return postal card
ROADS AND STREETS, July, 1958

New Products

(Continued from page 115)



Trojan T-18 Tractor Shovel

The "T-18" has an operating capacity of 2,500 lb. It has a 4-ft wheel base and an overall length of 117 in. It is powered by a Model 30 Chrysler engine developing 72 hp at 2000 rpm. It is equipped with fully automatic Yale torque transmission. It has a top speed of 13.75 mph in both forward and reverse and accelerates from 0 to 8 mph in 3.5 seconds and to full speed in 5.5 seconds. It has a dumping clearance of 6 ft. At this point there is a dump angle of 46° so as to allow for full and quick clean-out of the bucket. Two

outstanding safety features of the T-18 are the low load carrying position and the reverse curve safety arms. The low load carrying position permits the load to be carried at wheel level due to the 45° tip-back of the bucket. The reverse curve arms allow the operator full 360° vision with absolute personal safety at all times.

Yale & Towne Manufacturing Co., Contractors Machinery Division, Batavia, N.Y.

For more details circle 124 on Enclosed Return Postal Card.

Fast-Operating Backhoe

The Shawnee 88 backhoe here shown has been tested and cleared by John Deere for use on their 440-I tractor in connection with the John Deere 71 loader, and also for mounting on the John Deere 440-IC crawler in conjunc-



Shawnee Backhoe on John Deere Loader

tion with the John Deere 91 loader. It has been designated by the manufacturer as the first backhoe designed for the fast operator. Loading height is 9 ft 9 in. and digging depth is 12 ft. Attachment to tractor is by four pins.

Shawnee Mfg. Co., Inc., 1947 Topeka Ave., Topeka, Kan.

For more details circle 125 on Enclosed Return Postal Card.

Small Air-Cooled Diesels

Three new air-cooled diesel engines made by Kloeckner-Humboldt-Deutz, of Cologne, West Germany, have been added to the line handled by Diesel Energy Corp., New York City, sole United States representative of the manufacturer.

The new units, known as the "Deutz" models F3L712, F4L712, and F6L712 have respective ratings of 45, 60, and 90 brake horsepower for intermittent output at 2800 RPM; and of 33, 44, and 66 brake horsepower for continuous 24-hour output at 2300 RPM. The weights, including all standard accessories and electrical starting equipment, are 616, 693, and 902 lb. These engines are designed for use in off-highway vehicles, construction and farm equipment, stationary installations or marine service.

Diesel Energy Corp., 82 Beaver St., New York, N. Y.

For more details circle 126 on Enclosed Return Postal Card.

(Continued on page 131)

FORD combustion chambers are fully machined for more efficient fuel use ... longer engine life



Another reason why
FORD
Super Heavy Duty
INDUSTRIAL ENGINES
cut costs



• Because they're fully machined to uniform size, combustion chambers in the new Ford Super Heavy Duty engines provide each cylinder with an equal volume of fuel-air mixture. This enables the Ford engine to develop greater power from every drop of fuel.

Machining also helps eliminate carbon deposits that cause hot spots and wasteful pre-ignition of fuel ... gives you the most efficient engine money can buy.

This is typical of the many engineering advances you'll find in Ford's full line of 4-, 6- and V-8 cylinder engines ... ranging in displacement from 134 to 534 cubic inches. Included are two modern diesels—the Ford 220-cu. in. Diesel and the Ford 330-cu. in. Diesel. Most models are available as engine assemblies or complete power units, foot- or skid-mounted.

**YOUR JOB IS WELL-POWERED
WHEN IT'S FORD-POWERED**



Write or phone today for complete information: **INDUSTRIAL ENGINE DEPARTMENT**
FORD Division of FORD MOTOR COMPANY, P. O. BOX 598, DEARBORN, MICHIGAN

... for more details circle 264 on enclosed return postal card

Bituminous Methods and Practices

Big Asphalt Yardages in Winter Months

HEAVY-DUTY ASPHALT PAVEMENT FOR CHICAGO'S CALUMET SKYWAY

One of the fastest paving jobs ever seen in the Chicago area, involving unprecedented defiance to winter, enabled the Skyway toll bridge to open on time this past spring.

Exclusive to Roads and Streets

By Armen G. Avedisian

Vice President, The American Asphalt Paving Company, Chicago, Illinois

HEAVERY-DUTY asphalt pavement constructed during below freezing winter months enabled the City of Chicago to open the gates of the Calumet Skyway Toll Bridge on April 16 in record time. The Calumet Skyway, a 7.7 mile elevated toll bridge, extends from the Indiana East-West Toll Road's Illinois exit to 63rd and State Street on Chicago's south side.

● *Two Typical Design Sections.* The Calumet Skyway is a classic example of heavy duty asphalt construction on flexible base and also on bridge decking. This \$101 million bond financed road had two typical design sections. Four miles were on fill, the remaining 3.7 miles on bridge or trestle construction.

The fill sections had a cross section of 5 in. of bituminous concrete over 20 in. of crushed stone base. The binder was laid in two 1½-in. lifts; the surface course in one 2-in. lift. All of this was on 18 ft. of sand and/or slag fill, which placed the Skyway grade 20 ft. above existing city street grades.

The bridge sections called for 2 in. of bituminous concrete—1 in. thickness of binder and 1 in. of sur-

face course. Two 36-ft. traffic lanes are separated by 6 ft. and 12 ft. medians. On the outside of each 36-ft. roadway is a 9-ft. shoulder.

● *Sand and Slag Fill.* In June of 1956 construction began with clearing of buildings, grubbing, and removal of unsuitable material.

Sand and/or granular slag were placed in the roadway embankment

according to AASHO specification. Retaining walls, bridge and trestle sections were constructed through the winter of 1956-57.

● *Base Construction.* The 20-in. stone base that was constructed on the roadway embankment consists of a 12-in. thickness of special granular embankment and 8-in. thickness of stabilized stone base course. Although Grade No. 8 crushed stone met both embankment and base gradation requirements, the method of construction differed.

The special granular embankment stone was deposited directly on the roadbed and bladed or put through a Jersey spreader. The stabilized stone base material was tailgated into windrows and then bladed into windrows of uniform sizes for thorough mixing.

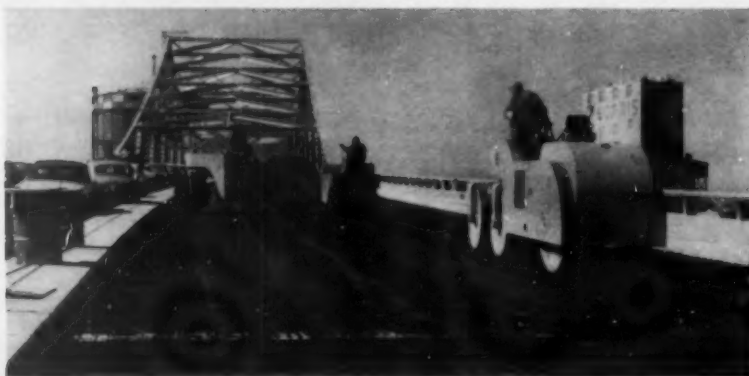
● *Showing two of the three finishers laying 1-in. surface course on 36-ft. wide bridge deck. Initial compaction by 3-wheel roller.*





● Luteman, raker and straight-edge man check mat before and after rolling.

● Barber-Greene finishing machine laying over bridge dam.



● One-inch bridge deck binder being compacted with 3-axle and 2-axle tandems and pneumatic-tired roller. One roller is rolling transversely at a joint.

Water was then accurately added before final windrowing. After the material was spread in layers of 6 and 8 in., additional water was added for optimum moisture content. Maximum density of 100 percent was obtained by the use of tamping, rubber-tired, 3-wheel and 50-ton rollers.

Bituminous paving started in Oc-

tober of 1957, and continued throughout the winter as rapidly as flexible base and bridge sections were completed. December and March were the big production months. Paramount in this winter paving operation was the ability of the equipment to function day-in and day-out in below freezing weather.



● Austin-Western grader blading base on one of Skyway contracts, while 8-ton tandem does finish rolling.

Gradation of 8-In. Thick Stabilized Aggregate Stone Base Course

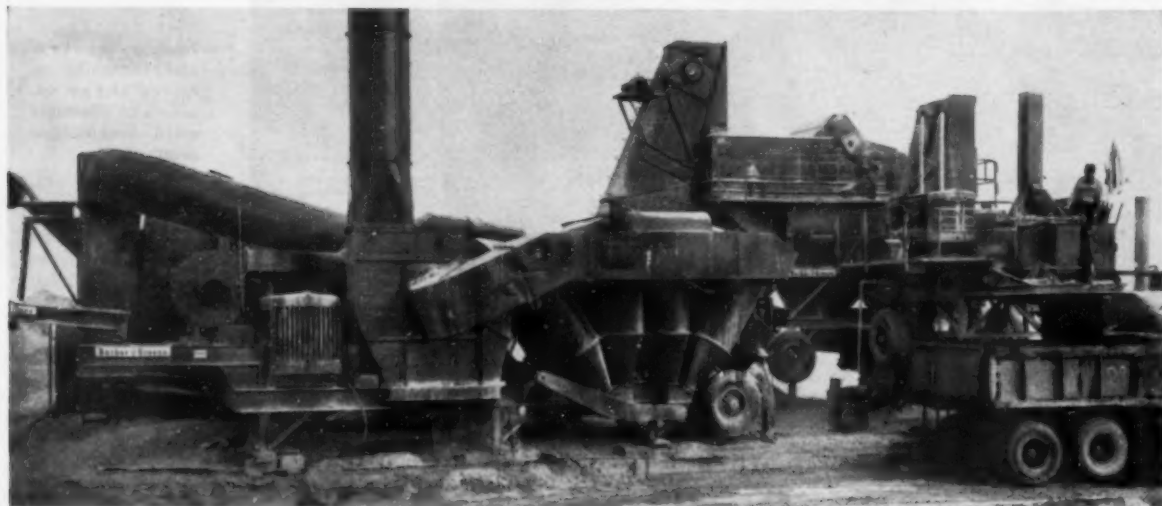
Sieve Size	% Passing
1½ In.	100
1 In.	95 to 100
¾ In.	70 to 100
¾ In.	50 to 80
No. 4	35 to 60
No. 10	25 to 50
No. 40	15 to 35
No. 200	5 to 20

● **Three Finishing Machines.** To insure the continuous operation and to eliminate cold longitudinal joints on the bridge deck sections, the special "winter" specifications called for three 12 ft. Barber-Greene finishing machines paving simultaneously. An additional finisher was kept on the job as a spare. Although 2-in. high transverse expansion and contraction dams were at intervals as close as 100 ft., the finishers did an excellent job of laying the mat true to grade.

● **Four Different Rollers.** Compaction of the fine, dense-surface course was accomplished with four different type rollers. Since low temperature cooled the mix quickly, timing was the essence of the compaction operation. Initial rolling immediately behind the finishers was done with a three-wheel, 10-ton Galion roller.

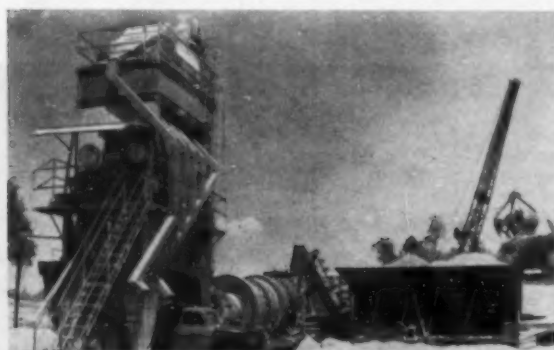
Since the pavement did not have the benefit of further consolidation by traffic, a Bros self-propelled pneumatic-tired roller was employed. Sand ballast brought its weight to 10 tons. To prevent the rubber tires from picking up asphalt, liquid detergent (household type) was added to the water. Any surface imperfections were ironed out with a heavy duty three-axle tandem Buffalo-Springfield 13-20 ton roller utilizing the transfer of weight theory. Transverse rolling at the bridge dams and final rolling

Machines of tomorrow ready to cut your costs today



With capacities from 20 to more than 200 tons per hour, Barber-Greene Continuous Asphalt Plants offer unmatched portability, automatic operation, interlocked proportioning, and the ability to meet the most exacting

specifications. The human element is eliminated, and manpower requirements reduced to the minimum. Erection consists merely of spotting the units at the job site and jacking into position.



The only batch plant designed for truly automatic operation, Barber-Greene BatchOmatic simultaneously measures all sizes of aggregate and eliminates the human element in achieving accuracy and maximum capacity. Instantly switched from automatic to manual operation and from manual to automatic. New Dyna-Mix pugmill gives thorough coating in less time than any other batch pugmill made. Instant, positive inspection of aggregate gradation and weight. Available in 2000-, 4000- and 6000-pound sizes.



The new Model 879-B Finisher is establishing even higher standards of speed, accuracy and economy. Latest improvements include greater receiving hopper capacity, new transmission for faster operating and travel speeds, higher-speed tamper for faster laying speeds, new crawlers which further decrease maintenance costs, and new power unit with 20% more power for pushing even bigger trucks and handling even steeper grades. Automatic leveling and independent tamper combine to produce a level surface that will stay level under rolling and traffic.

Write for literature on the world's most modern asphalt paving equipment.

58-17-AL

Barber-Greene



AURORA, ILLINOIS, U.S.A.

CONVEYORS...LOADERS...DITCHERS...ASPALT PAVING EQUIPMENT

... for more details circle 241 on enclosed return postal card

ROADS AND STREETS, July, 1958

121



● Special "winter" specifications required three finishers to eliminate cold longitudinal joint.

was with a Huber-Warco 10-ton tandem roller.

● **Make Own Tests.** Surface tests were taken by straight edging. Allowable tolerance was $\frac{1}{8}$ in. per 10 ft. Rather than wait until days after for inspection, a Viking Bumpmeter was used to check the mat. This was done immediately after the initial rolling so that, if necessary, corrections could still be made by hand or with rollers.

Although the 9-ft. shoulder and 8-ft. medians originally were plan-

ned as penetration construction, bituminous concrete was used when weather ruled out penetration. To eliminate hand work a Miller tow-type spreader box was used.

Priming at the rate 0.4 gal. per sq. yd. of MC-O on the flexible base and 0.1 gal. per sq. yd. of RC-O on the bridge decks was done with an Etnyre distributor. To prevent high winds off Lake Michigan from carrying the prime onto curbs and medians, the entire spray bar was covered with canvas. This worked very well. Exposed vertical edges were

painted by hand.

A fleet of International 170 trucks with insulated beds and tarpaulin covers transported the mix to the job. Temperature of the mix at the finisher was 315 degrees.

● **Two Plant Operation.** The American Asphalt Paving Company employed both of its plants in the production of the bituminous concrete—a 7,000-lb. batch, Standard Steel Corporation plant and a 3,500-lb. batch, Hetherington & Berner plant. By close cooperation with

● Aerial photo of Calumet Skyway looking northward from Indiana end toward mid-Chicago. 7.7 mile project starts at elevated connection with Indiana Toll Road at 106 Street and Indianapolis Boulevard and spans Calumet River (right foreground). The only toll plaza is located in middle of Skyway. Stony Island and State Street ramps are at upper left.

Bituminous Concrete Mixtures for Chicago's Skyway

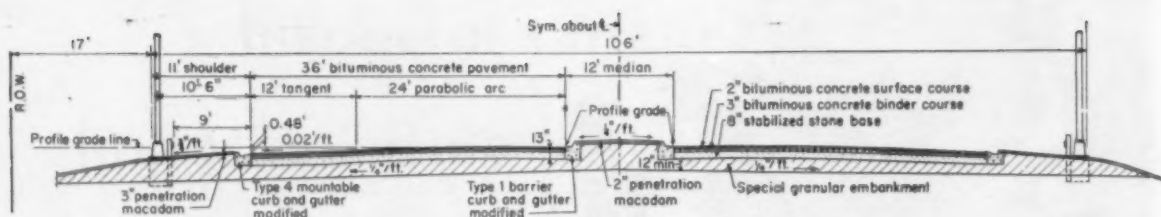
Surface Course Mixture

Passing	Retained	
$\frac{1}{2}$ in.	4	31.0%
4	10	24.8
10	40	11.5
40	80	13.7
80	200	7.0
200		5.8
A.C. content		6.2
		100.0

1½-in. Binder Course Material

Passing	Retained	
1 in.	$\frac{3}{4}$	25.0%
$\frac{3}{4}$	$\frac{1}{2}$	17.0
$\frac{1}{2}$	4	15.9
4	10	9.3
10	40	10.6
40	80	11.0
80	200	4.9
200		1.4
A.C. content		4.9
		100.0





● Cross-section of the Calumet Skyway's heavy-duty asphaltic pavement.

material suppliers, careful aggregate handling prevented freezing of aggregates. Childers hot-oil heaters eliminated the freezing problem of asphalt storage tanks and lines.

The paving asphalt was 60 to 70 penetration. A modification of the surface course mixture was used for the 1-in. binder course on the bridge decks.

● **Three Asphalt Contractors.** The Skyway was divided into major sections, with seven section engineers. DeLeuw, Cather and Company were consulting and coordinating engineers for the city of Chicago. Walter Flood was responsible for plant inspection. Three Chicago contractors did all of the asphalt paving. The J. M. Corbett Com-

pany and Rock Road Construction Company each had major asphalt paving sections. The American Asphalt Paving Company paved five sections.

The city of Chicago took alternate bids: Bituminous concrete versus p.c.c. concrete. The flexible base asphalt bids were lower in cost than the rigid type construction. The design engineers agreed that with bituminous concrete maintenance would be easy, there would be a minimum of traffic noise, snow would melt faster, and that the design would offer good durability under very heavy traffic. To the question "Can Heavy Duty Asphalt Pavement be constructed during a Chicago winter?", the Calumet Skyway is the answer.

Engineers "Need More Liberal Arts Education"

A study of Purdue University engineering graduates, classes of 1911 through 1956, stresses the need of a good basic education as a groundwork for professional training.

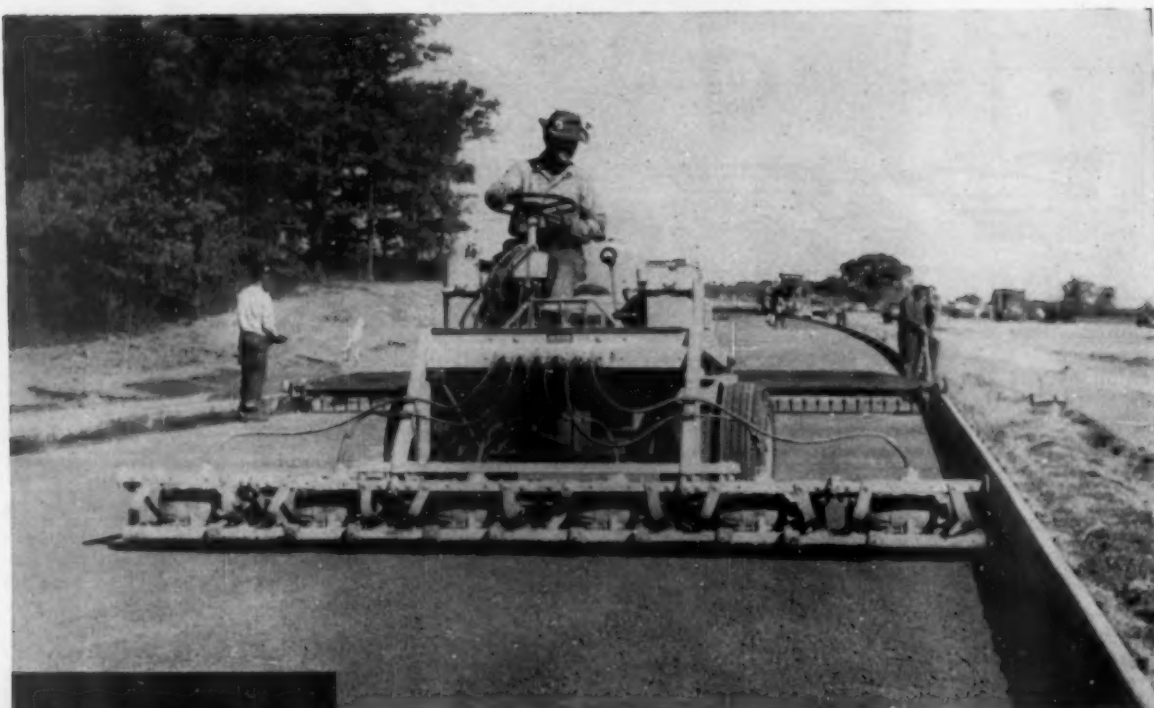
Questionnaires returned by 3,800 alumni emphasized the importance of speech and English composition. Graduates were asked to rank in importance various goals of general education at the college level. First place went to "to express one's thoughts effectively"; second was "to acquire and use the skills and habits involved in critical and constructive thinking," and third, "to learn to get along with people."

Even the specific goals for engineering education indicated the importance of intermingling liberal arts disciplines with science. The first three, for example, were "the ability to think straight in the application of fundamental principles to new problems" the "ability to organize thought logically" and "mastery of fundamental scientific principles."

As to the sort of college schedule the alumni would suggest for engineers, the report showed that 29 percent prefer a four-year engineering curriculum, 35 percent prefer a five-year program, 5 percent a six-year program and 28 percent a cooperative plan with industry. Most graduates liked the program they had taken, but a large minority said they would have profited by more general engineering or a business administration curriculum. Among the "must" course requirements, they felt, were speech, English composition, economics and psychology.

Almost 90 percent of the graduates, the study showed, are still engaged in engineering. About 30 percent are engaged in design, development and research; 23 percent in technical management; 12 percent in construction, production or maintenance, and an equal number in sales and application engineering.





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**PROVIDE TOP COMPACTION PERFORMANCE,
UNMATCHED JOB ADAPTABILITY!**

A combination which accounts for the fact that more of these machines have been used on major paving projects than all other pan type compactors combined . . . and their popularity continues to increase. Tremendously powerful vibratory action provides 100% of specified density of any material normally used in macadam base or sub-base courses in the shortest possible time. Each unit in the work-head supplies 4200 THREE-TON BLOWS PER MINUTE. And they are FAR MORE VERSATILE THAN ANY OTHER COMPACTOR, ideally adjustable to each and every job requirement. Coverage is what you want it to be, up to 13', 3". Any arrangement of the compactor units, as indicated, is quickly attainable. With this machine you can compact areas others can't touch, a factor that eliminates lost motion and saves a great deal of time and money. And, of course, it is equally effective on all types of granular soil fills and similar projects. By all means inspect it at your Jackson distributor.



Any of the compacting units in the workhead can be fitted with operating handle and used exactly like the nationally renowned Jackson manually guided Compactors. Perfect for getting into spots others can't touch. With twin hook-up of two units one man will compact 1,200 sq. yds. in 6" layers per hour.

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Inspector's Manual Plays Important Role in Materials Control

Emphasis in Minnesota manual is placed on developing practical judgment in the appraisal of materials during processing and placement. Key problem is the effective utilization of glacial pit material, which, while relatively plentiful and widespread, varies greatly in gradation.

By H. K. Glidden

Contributing Editor, Roads and Streets

ONE of the most progressive state highway departments is that of Minnesota, where a tradition of dedicated leadership has long existed. Its present leaders credit its technical accomplishments largely to the effective development of its personnel. This statement broadly includes the contractors of the state. The relatively high dissemination of know-how became better appreciated by this observer during a month's tour of the state during the construction season.

It was noticeable that engineers, inspectors, contractors, superintendents, foremen and operators, all with few exceptions showed a competent knowledge of their particular job, and appeared to take a pride in their work. A family-group attitude is evidenced among contractors' employees in particular, and a sense of high morale in the highway department.

Department Manuals

Reflecting the best thinking of the staff are the department's manuals. Several have been developed to assist engineers and inspectors in the various phases of construction. The introduction to the Manual for Grading and Base Construction states "This manual has been prepared to aid the Project Engineer and his inspectors in sampling, testing, and inspection on grading and base construction project." The manual is a sensible mixture of technical language combined with a down-to-earth explanation of the intention of the various specifications and how to accomplish the required results through tests and

visual observation.

The manual goes to great length to point out the pitfalls awaiting an inspector where conditions vary widely, or where test samples are improperly taken. It is common practice in the manual to end a discussion of a particular test or computation with the heading, "Relation of Test to Construction." In almost every instance a statement follows to the effect that "this test is used as a guide to control the production of aggregate or whatever phase of construction may be involved."

The manual also frequently admonishes the engineer or inspector to watch closely the physical characteristics, color, feel, and nature of any material or condition, so that he can correlate previous tests with a visual observation. This procedure is believed to greatly improve judgment through the system of keeping in mind the results of previous tests.

As another example of this sensible viewpoint, again quoting—"For the reason that there is considerable time consumed in making a gradation analysis, much reliance must be placed on visual and manual inspection. This is more true in variable deposits than in deposits of a uniform nature."

In further instances the manual points out that the actual gradation of gravel often varies from that assumed in design; some adjustment of proportions may be necessary. This statement is followed by an example illustrating how to go about adjusting such proportions. In other words, this book never makes a simple statement and leaves the inspector to wonder, "well that is a good idea, but how do you go about it?"

A considerable portion of the

manual is devoted to a semi-technical discussion of soil classification and identification. Stress is placed upon identifying the physical characteristics of various soil types, so that they can be quickly recognized.

There is repeated admonition that it doesn't take more than a few scraper loads of unsuitable subgrade material to seriously weaken that portion of the roadbed and probably result in failure.

Simple Tests

The manual's aim throughout is to make it easy for the technician type of employee to acquire wider knowledge of what is going on around him, so that he can readily spot a potential weakness. Emphasis is given to the simple feel and touch tests. These together with color and slipperiness, and other easily recognizable characteristics, make it possible for the inspector to become suspect of anything that indicates poor materials. On the other hand, there is frequent admonition that too great reliance on visual and manual inspection alone is dangerous.

The employee is constantly advised to correlate all the tests with the physical characteristics in order to eliminate guessing and actually have a test basis on which judgment is founded. The inspector is even advised to go so far as to keep tightly sealed jars, in which various soil classifications can be looked at and compared with the gradation and other tests which have been performed. This will tend to freshen the memory as to the looks and characteristics of various types of soils.



- Miss Betty Holden, secretary in the general office of Industrial Asphalt, relays an order to field plants via the Motorola two-way radio system.



- At the Upland, Calif. plant, Al Moore uses the two-way radio to call drivers or contact main office or other plants.



- Motorola two-way radio in cab of Industrial Asphalt dump truck keeps driver in contact. If a change is ordered, he can relay information back to plant, catching loads which might otherwise be wasted.



- Wallace Hunt, Jr., Director of Public Relations, Industrial Asphalt Co., stands beside radio-equipped company plane used to keep jobs going and do trouble shooting.

RADIO Helps Keep Hot-Mix Producer From Getting "Burned" with Wasted Loads

By James F. LeSage

Assistant General Manager,
Industrial Asphalt Co.,
Los Angeles, Calif.

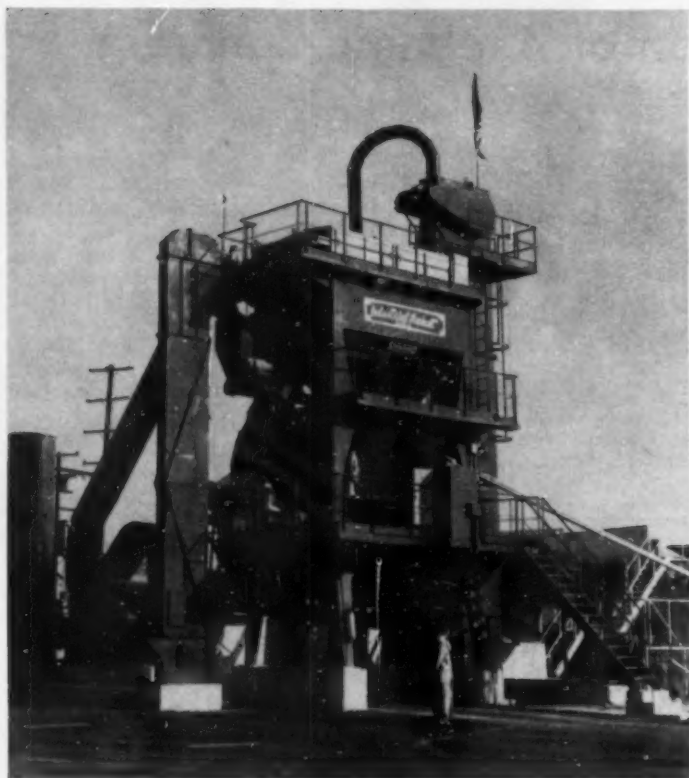
HANDLING 12,000 tons of bituminous plant-mix paving material every eight-hour day, which

is about one-third of our potential production, is like handling 12,000 tons of the proverbial hot potato. Exact coordination of all phases of the operation, from the manufacturing through the delivery, is necessary to keep from getting burned with heavy losses.

Our product is manufactured

hot, delivered hot and spread by the customer when hot. Any breakdown in our plant or delivery schedules means possible cooled-off truck loads of asphalt. These loads may have to be wasted, to avoid inferior pavement.

A note about our firm, Industrial Asphalt Co., which is possibly, the



● One of the firm's 26 company-owned asphalt plants—a 4,000 pounder located at Irwindale, California.

largest commercial manufacturer of asphalt paving materials in the world. The company supplies more than one-third of the total requirements for such materials in and near the Los Angeles area. Hence our coordination problems are plentiful. We operate 26 plants in the area, each having its own office, vehicles and other supporting equipment. A key factor in the coordination we have accomplished is our two-year old radio system, built by Motorola, Inc.

We have 16 base stations, three repeater transmitter-receivers and 28 mobile units in operation in our trucks, cars and Cessna airplane, all operating on the 450-470 Mc. Citizens Band. The repeaters are used in the hilly area around Los Angeles to provide added range to the mobile units. In fact, you might say, we are one of the most "radio active" companies in Southern California.

We know now that radio communication is a vital necessity. Frankly, we don't know how we existed previous to installing our system, since much better service is given the customer, to say nothing of cutting our own expenses.

Perhaps the most important phase of the radio system is that the mixing plants can be notified immediately when no more asphalt is needed on the job. The asphalt is usually mixed at about 325 deg. F. and a truck load will stay hot enough to spread for about three hours. If kept waiting any longer period, it must be disposed of in some way other than on the job.

With each waste load of asphalt adding about \$50 to our operating expenses, our radio system is hardly a luxury. The waste saving alone pays for a good portion of the radio cost.

● Before installing the Motorola system, the supervisor on the job at a spreading operation would have to get a telephone to stop unneeded truck loads. But with radio, he does it as quickly as the need arises. Usually of course, the exact amount of material needed is known, but not always. At other times, the inspector may say the mix needs immediate changing—which means stopping further trucks from leaving the plants with the old formula. Here is where radio really helps.

With as many as 20 different

mixes required in one day's operation to meet the varying specifications of state highway, county roads, city street and supermarket parking lots, the plants are started and stopped often. The radio dispatching is a very important cog in the network of coordination.

The radio comes in handy also when a vehicle breaks down. Sometimes, radio gets help to the truck in time to save the load.

Our employees too are overwhelmingly in favor of radio, feeling that the communications network makes their job easier.

Our four-place airplane is used to make aerial surveys of possible plant sites and to check progress of paving jobs. It is also used to police the company's plants for adequate control of air pollution.

● Besides these routine uses, our customers benefit from the plane through utilization of the craft as an aerial trouble shooter. With a Motorola radio in the Cessna, operating on the same frequency as the ground system, the plane is equipped for constant air-to-ground communications with all company vehicles, offices and plants.

In the case of emergencies, we will make the plane available to city, county and state agencies for air search-rescue activities. The plane is piloted by Wallace E. Hunt, Jr., our company's director of public relations, who until recently was an Air Force jet pilot. One routine use of the Motorola radio system made by Mr. Hunt involves calling various plants for weather checks prior to flights.

The entire two-way radiotelephone system is maintained, as well as supplied, by Motorola on a five-year lease basis. Mobile Radio, Inc., Whittier, Calif., a Motorola Service Station, handles the maintenance.

Snow Plowing Equipment for Mackinac Bridge

The Mackinac Bridge Authority in Michigan during its first winter of bridge operation has used two trucks each equipped with Root one-way snow plows for snow removal and Root hydraulic underbody scrapers for ice and impacted snow removal. In addition, a Root reversible plow with tripping moldboard is kept on hand for use on either truck and is interchangeable with the one-way plows.

Notes on Compaction of Asphaltic Concrete

Closer control of temperature during knock-down rolling is shown to be the key to uniform pavement quality.

By George E. Zorger

Supervisory Civil Engineer, Corps of Engineers
Huntington District, Huntington, West Virginia

THE ACCOMPANYING GRAPH SHOWS what happens when a number of specimens taken from the same sample of hot-mix are compacted at different temperatures. It may be seen at a glance that the two curves, percent voids total mix versus the molding temperature and the percent voids filled with asphalt versus the molding temperature, are practically reciprocal curves. It also follows axiomatically that the higher the density in the asphaltic concrete, the higher will be the percent of voids filled with asphalt and the lower will be the voids total mix; and that the lower the density in the asphaltic concrete, the lower will be the percent of voids filled with asphalt and the higher will be the voids total mix.

Since it is common knowledge that asphalt mixes compact to higher densities at high temperatures and to lower densities at lower temperatures, the results of the plotting are just about what one would expect. However, to one who has never seen such a plotting, the curves do emphasize the wide range in the variation of two of the most important physical properties of asphaltic concrete that may be obtained within the range of field compaction temperatures.

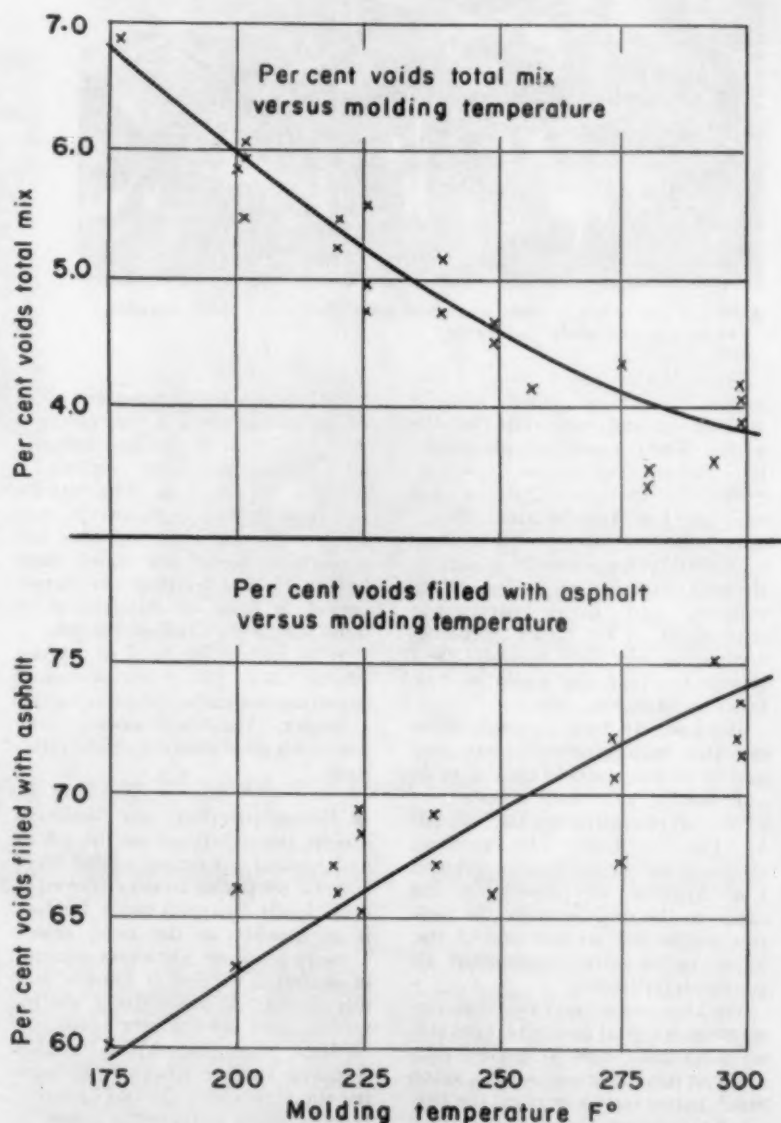
● On the average job the hot-mix is delivered to the spreader at about 285°F plus or minus about 15°F. If the job is well supervised, the initial knock-down rolling will be applied as soon as the hot-mix will bear the weight of the roller as determined by an experienced roller man. For different mixes that temperature will vary but will usually range between 250°F to 285°F, or perhaps even a little higher if the temperature of the hot-mix as it comes from the plant is on the high side and the weather is warm. However, if the job is only "adequately supervised" within the full range of temperature permitted by

the specifications, the initial knock-down rolling might be applied at temperatures anywhere from a little below 225°F (perhaps 200°F)

on the low side to about 300°F. Now take a look at the accompanying curves again and you will see exactly what has been produced. Let us not talk about a poorly supervised job because we have already had that.

It is a known fact that about 90 percent of the density that can be obtained in a pavement is obtained in the knock-down rolling; hence it is hardly to be expected that pro-

(Continued on page 156)



● Two of the basic relationships referred to in the accompanying discussion.



FILL COMPACTION—Tests proved this DUO-PACTOR, owned by a Wisconsin contractor, gave nearly 100% of Proctor on a section of Illinois Tri-State Tollway. At day's end, the DUO-PACTOR makes a final pass to seal the surface so that it sheds water in case of rain.

Handle every phase of the job with just ONE compaction tool!

By combining steel and rubber rolls, DUO-PACTOR gives you a *complete* compaction and surface rolling system from initial fill to base course and seal coat—all in one rugged, low-cost, self-propelled unit. The closely spaced rubber tires confine surface pressures, preventing displacement, to form compacted tracks of high density. The steel roll chokes in the ridged material between the tracks, provid-

ing high, uniform density. On any kind of material, the alternate action of rubber and steel rolls produces higher, more uniform densities than can any one-purpose compaction equipment.

DUO-PACTOR costs far less to buy, too! You get the equal of two or more machines for one modest price. Before you buy *any* compaction equipment, it will pay to investigate DUO-PACTOR first.

SUBBASE—DUO-PACTOR's closely spaced rubber tires confine the material to prevent displacement. The steel roll provides uniform surface pressure for uniform leveling and compaction, thus providing the second phase of Duo-Paction.

BASE COURSE—Duo-Paction is highly desirable on base courses. The rubber rolls key in course materials, preventing segregation. The steel rolls then give a downward and lateral movement of the ridged material. This combined action results in high density and positive uniformity.

SEAL COAT—The DUO-PACTOR's rubber tires press the chips into the bitumen. Spring-mounted in pairs, their wide range of vertical travel provides high compressive pressures in the low spots. Final rolling is done with controlled pressure of the steel roll.



Send for free copy
of "COMPACT FACTS"
... about DUO-PACTION."

Seaman-Gunnison Corporation
2763 S. 27th St., Milwaukee 15, Wis.



- DUO-PACTOR
- Utility Scraper
- Bituminous Distributors
- Street Flushers

... for more details circle 311 on enclosed return postal card

Now there is a quick, easy way to **reflectorize** construction hazards

You asked for a fast, simple, low cost way to reflectorize construction hazards, so we put our research laboratories to work on the problem. They came up with the answer . . . and we named it "Codit" Reflective Liquid.

What is "Codit" Liquid?

Scientifically, it is a suspension of reflective elements in a solvent-dispersed vehicle. You simply apply

How does it Reflect?

"Codit" Liquid gives you wide angle reflectivity you can see from any angle of approach. Since it is a reflex-reflector, it catches the approaching headlight beam and directs the gathered light right back to the source. The driver then sees a warning that is 40 to 50 times brighter than white paint.

At night, the reflective warning

The cost is easy to take, too . . . less than 17¢ per square foot of coverage.

Where to use it?

Put it on any temporary or permanent objects in or near a roadway that constitute hazards to traffic. "Codit" Liquid will adhere to any rough or porous surface—wood, metal, gravel, concrete and the like.

You can use it effectively on construction or repair barricades, pipe, stone, windrows, road equipment, temporary structures, railings, guard rails, trees . . . literally everything.



Road construction equipment and hazards flash their own warning when painted with "Codit" Reflective Liquid. Motorists travelling at night are warned of danger in time to act safely.

the liquid to any rough or porous surface, and the film formed holds the reflectors in a tight grip. Thus, in only one easy brush stroke, you can give any type of hazard the safety of a bright reflective warning.

is a glareless silver-white color, and by day it is a neutral gray.

Application ease and low cost

Remarkably rugged "Codit" Liquid can be easily applied by hand spray gun, tank type spray equipment, or by a simple kalsomine brush. It is also available in handy aerosol spray cans for extra convenience. You just spray it on or brush it on in a jiffy. It dries in minutes. And you've finished the whole reflectorization job.

A little goes a long way, too. One of those small 6 ounce aerosol cans will cover 6 to 8 square feet with reflective safety that keeps its brightness up to two years.



"Codit" Liquid adheres to any rough or porous surface . . . wood, concrete, metal, etc.

. . . for more details circle 292 on enclosed return postal card



Special introductory offer

Right now, at a special introductory low cost, you can reflectorize road hazards the quickest, easiest way yet. For only \$85.00 you get a complete "Codit" Reflective Liquid Kit, containing everything—brushes, 5 pound cans, 6 ounce aerosol cans, stencils—you need for hazard marking. You can get this kit from your 3M Field Representative. Or mail coupon now.

REG. U. S. PAT. OFF.
CODIT
BRAND
REFLECTIVE LIQUID



The terms "Codit" and "3M" are registered trademarks of Minnesota Mining & Mfg. Co., St. Paul 6, Minn. General Export: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ont.

3M COMPANY, Dept. NU-78, St. Paul 6, Minn.

Please send me _____ introductory kits of "Codit" Reflective Liquid at \$85.00 each. I enclose check or money order, for _____

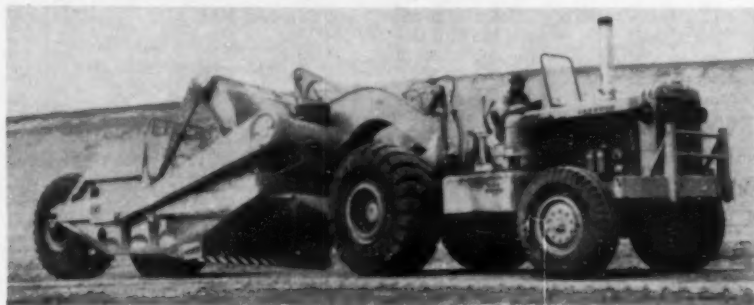
NAME _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

More New Products



New "Esco" Toothed Scraper Edge

Cutting Edge With Teeth

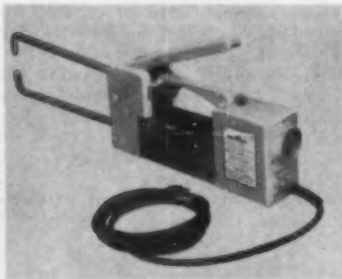
Field reports indicate that the new cutting edge here pictured performs exceptionally well in rock, shale, limestone, hardpack clay, sandstone and other tight formations. Working in limestone and shale, a 15½-yard scraper equipped with this edge is stated to have loaded in 45 seconds while a conventional blade loaded in one minute and thirty seconds. In hard packed clay the comparison was one minute to one minute fifty seconds. A conventional cutting edge, aided by rippers attached to the pushcart, loaded rock and shale in 30 seconds, while a scraper equipped with the tooth type blade reduced loading time to 20 seconds and eliminated the use of rippers.

Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Oregon or 1017 Griggs St., Danville, Ill.

For more details circle 127 on
Enclosed Return Postal Card.

Automatic Spot Welder

A new spot welder, the "Lectro Spot," is announced by Miller Electric Co. A built-in electronic timer is claimed to produce completely uniform welds. Both timer and handle pressure multiplier are instantly adjustable. When operating handle is depressed, tongs grip work at pre-



Miller's "Lectro Spot" Welder

determined pressure, start switch is actuated and weld sequence starts and stops automatically. Telltale light shows when current is on. Available in three models: 110v or 220v 1.5 KVA models weighing 29 lb; and 220c 2.5 KVA size at 39 lb.

Miller Electric Manufacturing Co., Appleton, Wis.

For more details circle 128 on
Enclosed Return Postal Card.

Nylon Truck Tire

A new high quality, economy truck tire, made with all nylon cord has been announced by B. F. Goodrich Tire Co. for over-the-road service.

Named the "All-Nylon Heavy Duty Express" and made in tubeless and tube-type, the new tire is available in 13 sizes, ranging from 6.70-15 to 10.00-22. The number of piles ranges from six to twelve, depending on the size of the tire. According to Goodrich engineers, the "All-Nylon HD Express" has a tread as thick as tires built for heavier service. As the tread meets the road across its entire width, hundreds of curves edging each rib give extra traction and increased resistance to skids.

B. F. Goodrich Tire Co., Akron, Ohio.

For more details circle 129 on
Enclosed Return Postal Card.

Broom Attachment for the "Work Bull"

A new pick-up street sweeper attachment that permits using the Massey-Ferguson "Work Bull 1001" as a loader one day and a sweeper the next makes it possible for a community to have a highly efficient sweeper without tying up capital and operator in a single-purpose machine. In addition, communities, contractors and industrial concerns can use the "Work Bull" with various power-matched attachments for a wide variety of other types of work.

An important feature of the sweeper attachment is that it provides hydraulic dump control on the ¾ cu. yd. dust pan, which dumps directly into a truck.



"Work Bull" with Sweeper

Dust is kept to a minimum by a sprinkling system from twin water reservoirs of 100 gallon capacity attached to the tractor side frames.

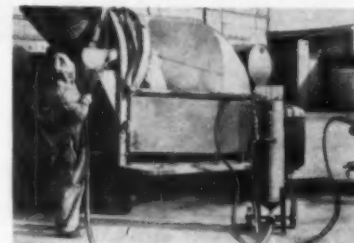
Massey-Ferguson Industrial Division, 1009 South West St., Wichita, Kan.

For more details circle 130 on
Enclosed Return Postal Card.

For Tough Equipment-Cleaning Jobs

Illustration shows sandblast cleaning of a truck mixer which quickly removes rust, paint, scale and concrete prior to painting. Blasting machine provides quick and easy removal of caked-on concrete from ready mix trucks, providing a fully clean metal surface for application of primer or finish coats of paint. Primary advantage is the rapidity with which the work is done. Ordinary dry sand is used. Blast machines are available in several sizes and types.

Ruemelin Manufacturing Co., 3860 N. Palmer St., Milwaukee 12, Wis.



Ruemelin Sand Blaster at Work

For more details circle 131 on
Enclosed Return Postal Card.

Fence for Safer Night Driving

Steel fencing laced with California redwood slats to intercept headlight glare on curves is here shown in a trial installation on U. S. Highway 99 near Fort Lewis, Washington. It is announced as a success by the Washington State Highway Commission in its campaign to make night driving safer. Two other Washington installations, designed to meet different conditions of alignment and traffic are reported as equally satisfactory.

This new product, designated "Rustake Fence", was developed by United



"Rustake Fence" on a Curve

States Steel's "Cyclone" fence organization in collaboration with Washington State highway officials.

United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Penna.

For more details circle 132 on Enclosed Return Postal Card.

Loader and Backhoe

Two new loader and backhoe combinations for Minneapolis-Moline 335 and 445 industrial tractors have been announced. They are designated as the L-3 and L-4 "Wheelloaders." The L-3 has 47 tractor brake horsepower and L-4 has 57 hp.

Capacity of the loader bucket on the L-3 is $\frac{1}{2}$ yd; on the L-4 it is $\frac{3}{4}$ yd. On both models lifting capacity is 2,000 lb; lift height is 10 ft. 7 in; dumping height is 8 ft; reach at 8-ft. dump is 21 in; and breakdown force is 3,500 lb.



L-4 Wheelloader on Backfill Job

On both L-3 and L-4 backhoes, digging depth is 12 ft 6 in. Reach is 19 ft 1 in. from the rear axle, and 15 ft 6 in. from the swing axis. Swing radius continuous is 190°. Transport height is 11 ft. Bucket widths range from 14 in. to 36 in.

Minneapolis-Moline Co., P. O. Box 1050, Minneapolis 40, Minn.

For more details circle 133 on Enclosed Return Postal Card.

Versatile Fork Lift

A new, versatile tractor-mounted fork lift, introduced by Sherman; lifts 4,000 lb. at 24-in. load center and 5,000 lb. at 15-in. load center. The lifting height is 12 ft. 6 in. Open channel ends facilitate service of carriage and rollers without disassembling the mast.

Tractor power steering is utilized in combination with a special Sherman steering valve and linkage which provides greatly improved maneuverability. Among available accessories are special concrete block forks, a hydraulically-operated log clamp, a dozer blade, a hydraulic scoop bucket designed for such bulk materials as sand and gravel, and an auto tote.

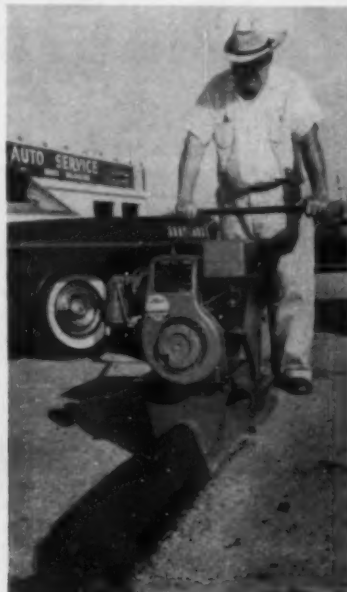
Sherman Products, Inc., Royal Oak, Mich.

For more details circle 134 on Enclosed Return Postal Card.

Curb Building Machine

The BMCO curbing machine introduced recently by the Browning Manufacturing Co., has a 6,000 lb. positive extrusion force that absolutely eliminates clogging. It easily lays up to 150 ft. of 6-in. asphalt curb per hour and requires no sand packing, according to the manufacturer. Three standard forms may be interchanged. The machine is self propelled, requiring only steering by the operator.

Browning Manufacturing Co., San Antonio, Texas.



BMCO Asphalt Curber

For more details circle 135 on Enclosed Return Postal Card.

Microwave Radio Station

A compact transmitter-receiver unit for microwave radio relay systems that provides five times the previous one-package channel availability, and can be inexpensively pole-mounted has been announced by RCA.

The new RCA MM-9E operates with a minimum of interference from atmospheric conditions, permitting uninterrupted remote control of a pipeline system from a central point, with no threat of broken wire circuits in ice or snow storms. It provides 24

channels for voice communications, facsimile transmissions, teletypewriter and remote control functions.

Communications Equipment Sales Department, Industrial Electronic Products, Radio Corporation of America, Camden, N. J.

For more details circle 136 on Enclosed Return Postal Card.



"Wedge-Lok" Slide Connector

Form Slide Converter

A new "Wedge-Lok" slide converter added to the line of Clark Industries is stated to enable form strippers to remove any section of curb, gutter, or sidewalk forms without disturbing adjacent units. Each 10-ft. section has three stake pockets, with division plate slots placed at 18-in. intervals. Alignment of stake pockets and belt holes allows stacking of forms to pour variable depth concrete.

Clark Industries, Construction Equipment Division, 375 East Fifth Ave., Columbus, Ohio.

For more details circle 137 on Enclosed Return Postal Card.

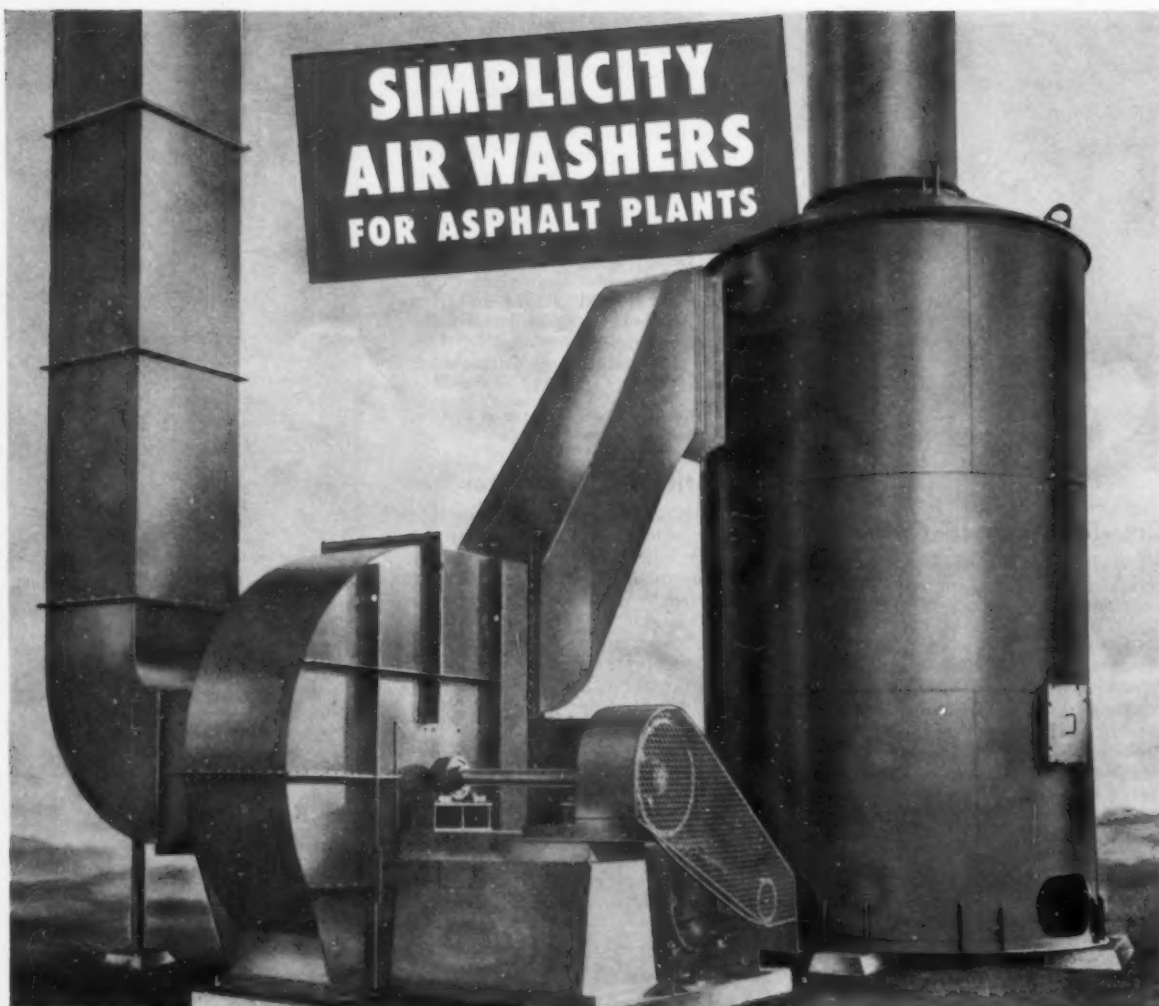
Rubber Conveyor Belts

A new line of "Nycord" rubber conveyor belts made with cord plies and designed for general industrial use, including sand, gravel and quarry operations, has been announced by B. F. Goodrich Industrial Products Co.

The new construction is claimed to greatly increase edge protection, fastener holding ability, impact resistance, and provides extra protection against damaging effects of acid, moisture and mildew. Each cord is completely insulated and imbedded in rubber. Water or acid entering through a cover cut can not wick throughout the carcass, to cause early failure.

B. F. Goodrich Industrial Products Co., Akron, Ohio.

For more details circle 138 on Enclosed Return Postal Card.



SIMPLICITY AIR WASHERS FOR ASPHALT PLANTS

**ELIMINATE
SMOKE
and DUST**

Prevent or quickly and satisfactorily settle many court orders and lawsuits . . . but it's lots smarter to eliminate smoke and dust **before** a complaint is made. A few days shutdown costs you more than the price of a Simplicity Air Washer!

Easily worth the money even where no neighborhood nuisance exists: Improves morale of plant crew. Protects expensive machinery from the destructive effects of dust and smoke.

Inexpensive but highly efficient. Simplicity Air Washers are part of most Simplicity Asphalt Plants and have been successfully added to all other makes. Full details and quotation to meet your requirements on request. No obligation; no sales annoyance. Simply address:

D E P E N D A B L E

**THE SIMPLICITY
SYSTEM**

FROM BUILDER TO BUYER
BETWEEN MEN WHO KNOW

THE SIMPLICITY SYSTEM CO.

RIVERSIDE DRIVE • PHONE MADISON 2-2144

CHATTANOOGA 6, TENNESSEE



Koehring 545 "Sprawler"

Crawler-Mounted Crane

Capacity to lift 90,000 lb. with a 40-ft. boom, 11,000 lb. more than its own working weight, is one of the important features of the new crawler-mounted Koehring 545 "Sprawler".

Pivoting outriggers, used when making heavy lifts, are quickly swung into position and pedestals attached. When moving, the outriggers can be folded back to an out-of-the-way position alongside the crawlers, or can be removed completely. The 545 can "walk" with 61,500 lb. when the outriggers are not used.

By stripping the "Sprawler" for transportation, it is possible to reduce the shipping weight from 79,000 lb. to 47,500 lb. With the A-frame in a lowered position, the 545 can be moved through low clearance structures.

Koehring Division, Milwaukee 16, Wis.

For more details circle 139 on
Enclosed Return Postal Card.

Towed-Type Spreader

A completely new, more-rugged and easier-to-use version of the Odell towed-type spreader, announced by Good Roads Machinery Co., is designed for



New Odell Spreader

aggregate or asphalt spreading from feather-edge to 8 in. depth.

A new floating strike-off bar is independent of the happer, and accurately controls spread depth. Spread is adjustable from 1 to 10 ft. widths and to 8 in. depth. Adjustment of one bolt permits level spread or up to 1½ in. crown or reverse crown. Constant spread depth control is adjustable without tools and the spreader can produce taper. Depth is controlled by independent roller side runners which do not support hopper weight and thus ride on soft base material without digging or gouging.

Goods Roads Machinery Corporation, Minerva, Ohio.

For more details circle 140 on
Enclosed Return Postal Card.

Versatile DC Generator

A direct-coupled, beltless, portable electric generator, The Thor Model EG-2.5D, with a capacity of 2.5 kilowatts, supplying 115-volt direct current, is powered by a 4-cycle single-cylinder gasoline engine. The aluminum control box, with an indicator light, has two 15-ampere, three-prong receptacles of the straight bayonet-grounding type which also will accept two-prong plugs. The box is available with alternate three-prong 20-ampere, 125-volt grounded "twist-look" receptacles. Total weight of the unit, 165 lb.

Thor Power Tool Co., Prudential Plaza, Chicago, Ill.

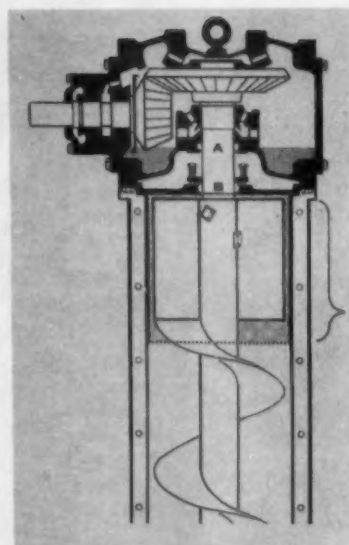


Thor's New 2½-KW Generator Set

For more details circle 141 on
Enclosed Return Postal Card.

"Dry Shaft Drive" Elevator

Complete protection of cement or other products from contamination by oil or dust is claimed for the "Super-Lift" screw elevator. The top "dry shaft drive," here shown in action, provides a triple guard against oil leakage: (1) As oil level is below top of bearing housing, there is no oil pressure on the vertical drive shaft; (2) only a positive metered amount of lubricant is fed to bearing; (3) a shaft umbrella diverts metered oil from the bearing directly to the reservoir, thus preventing possibility of leakage down the vertical shaft. Felt seal (A) around the shaft prevents entry of dust into the gear housing. The bottom drive unit is equally effective against the



Upper "Dry Shaft Drive" of Super-Lift Elevator

entry of contaminants.

Fort Worth Steel & Machinery Co., Fort Worth, Texas.

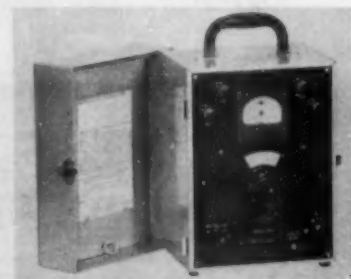
For more details circle 142 on
Enclosed Return Postal Card.

Soil Resistivity Tests

A new instrument for soil resistivity surveys, Model 274M "Michimho Vibrogound," announced by Associated Research, Inc., is designed to enable highway engineers and contractors to quickly and easily determine type, location, depth and extent of various soils and rock formations.

The "Michimho" is the result of close collaboration of the Michigan State Highway Department, which has developed a method of soil resistivity interpretation (called the "Barnes Layer Method"), and Associated Research, Inc. The Model 274M has met the rigorous field tests of other state highway departments for over three years.

Associated Research, Incorporated, 3771 West Belmont Ave., Chicago 18, Ill.



Model 274M "Michimho Vibrogound"

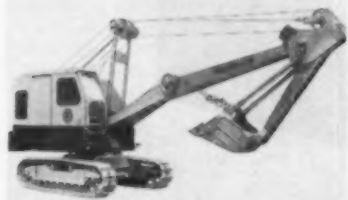
For more details circle 143 on
Enclosed Return Postal Card.

Hoe Has Tractor Crawlers

Tractor type crawlers, introduced recently on the Koehring 305 hoe, are stated to offer a track that not only gives longer service, but also requires less maintenance. Overall width of the crawlers with 20-in. wide shoes is 9 ft 5½ in. Overall length of the standard size crawler is 12 ft.

Maximum digging reach of the 305 model is 31 ft. Depth obtainable is 19 ft 9½ in. The clearance height at maximum dumping height of the ¾-yd dipper is 25 ft 2½ in. Clearance height at the beginning of the dump is 12 ft. 10 in. This is increased to 18 ft 7 in. at the end of the dump.

Koehring Division, Milwaukee 16, Wis.



Koehring 305 Hoe

For more details circle 144 on Enclosed Return Postal Card.

Heavy-Duty Stoper

The Le Roi S12VT is a new heavy duty stopper with telescopic feed and dust collecting system approved by the Bureau of Mines. Available in feed lengths of 34 in. and 52 in. The dust collector tank required with the stopper is the Le Roi DK288, a high vacuum pressure unit which has Bureau of Mines approval #BM2135. When used with required steel and bits, either CRD Vac-Nu-Matic or CRD 5-hole bits, dustless drilling can be done with a minimum amount of wear to stopper parts.

Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

For more details circle 145 on Enclosed Return Postal Card.



M-2 "Ditch Witch" Trencher

Small Trenching Machine

A new 1958 Model M-2 "Ditch Witch" trencher has been announced by Charles Machine Works. Features include new 8-in width trencher cutting to 30 in. depth, also a 6 x 36 in. 4½ x 36 in. and 3 x 48. New speed reduction unit with "Select-O-Matic" shift from digging speed to mobile speed provides four speeds forward and reverse.

Among new optional features available is a sod cutting attachment which can be mounted on the trencher in minutes. It is stated to cut an 8-in. sod strip up to 40 ft. per minute.

Charles Machine Works, 591 B St., Perry, Okla.

For more details circle 146 on Enclosed Return Postal Card.

Aluminum Clamshell

Aluminum has been introduced by the Owen Bucket Co. into the construction of power crane clamshell buckets for the handling of coal and other free-flowing materials. The new Owen product is stated to eliminate up to 1,000 lb of dead weight, depending on the size of the bucket.

Other features have been incorporated in the design of the lightweight bucket to minimize wear and strains on parts and on the crane on which it is mounted.

The Owen Bucket Co., 6001 Breckwater Ave., Cleveland 2, Ohio.

For more details circle 147 on Enclosed Return Postal Card.



Martin Model C155-A Trailer

Rear-Loading Trailer

A new 15-ton capacity rear-loading trailer, the Martin C155-A, has an 8 by 13-ft. platform and an overall length of 22 ft. 4 in. It is made with a 58-in. Gooseneck throat and carries four 10.00 x 15-14 ply tires on a single, full-width, tubular cambered axle.

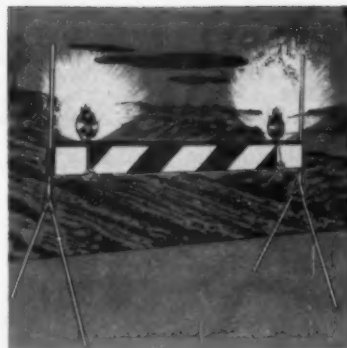
Hyster Co., Martin Trailer Division, Kewanee, Ill.

For more details circle 154 on Enclosed Return Postal Card.

Twin Flare Barricade

A new twin flare barricade, incorporating the Anthes oil flare burner, has been introduced by Anthes Company. The barricade is 5 ft. wide. The cross beam provides a 5-gal. steel tank for fuel. Burners at both ends are fed from this tank that provides a supply sufficient to keep them lit for 7 days without refueling or week-end servicing.

Anthes Co. Ft. Madison, Ia.



Twin Flare Barricade

For more details circle 148 on Enclosed Return Postal Card.

Street Sweeper Brushes

The "Danline" brush, developed and tested in Europe, was introduced into the United States in May of this year. It is claimed to afford extraordinary economies and to provide especial convenience to small users. The brush features three basic components; a permanent central steel core, reusable metal spacers, and circular wire brush sections. Two men can assemble a new brush in 20 minutes or less, the only equipment required being a ¾-in wrench. The usual filler is a special round steel wire 0.0275 in. in diameter.

"Danline" brushes are said to have lasted from 300 to 500 sweeping hours, and can be expected to give up to 600 sweeping miles per inch of water. On road construction they have been able to remove as much as 4 in of compacted sand in a single pass.

Newark Brush Co., 257 Michigan Ave., Kenilworth, New Jersey.

For more details circle 149 on Enclosed Return Postal Card.

Asphalt Heater

A new model "Rapid Fire" circulating heater, the No. 60, for liquid asphalt is announced by W. E. Grace Mfg. Co. Available for truck or trailer mounting, it features a single low pressure type burner, using no. 3 and lighter fuel oil or diesel fuel.

Heating rate on a 10,000-gallon insulated tank of asphalt is stated to average over 40 deg. F per hour. As in



No. 60 "Rapid Fire" Circulating Heater

the older Model 43, a principal feature is the spiral circulation of asphalt around the flues, preventing dead spots or overheating of asphalt. The No. 60 replaces the former Model 50. The Model 43, a larger and heavier unit, is still in production.

W. E. Grace Mfg. Co., 6007 S. Lamar St., Dallas, Texas.

For more details circle 150 on Enclosed Return Postal Card.



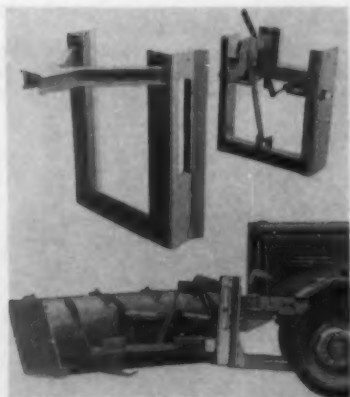
Wash-Down System on Truck Mixer

Truck Mixer Wash-Down

An automatic wash-down system for the discharge assembly has been introduced as standard equipment on all 1958 truck mixers of the Challenge Manufacturing Co. By simply turning a valve, after the discharge of each load of concrete, a hard, sharp spray of water knocks off all loose concrete from the rear cone section of the drum, the collecting hopper and the rear discharge fins, cleaning all the "hard-to-reach" places so frequently neglected or overlooked when washing the mixer.

Challenge Manufacturing Co., 7400 E. Bandini Blvd., Los Angeles, Calif.

For more details circle 151 on Enclosed Return Postal Card.



Quick Snap Coupling for Snow Plows

Snow Plow Coupling

A new snap coupling for snow plows introduced by Forage Master Mfg. Co., embodies a patented Husting hitch, and is claimed to enable one man to snap-couple a snow plow and truck in seconds without leaving the cab.

The universal coupling is stated to permit any truck to be used with any plow.

Forage Master Mfg. Co., Allenton, Wis.

For more details circle 152 on Enclosed Return Postal Card.

Trade Literature

"MODERN COMPACTION METHODS AND EQUIPMENT": a 52-page booklet from Bros. Inc., 1057 Tenth Ave., S.E., Minneapolis 14, Minn. Ten papers selected from various sources discuss practical compaction by both rolling and vibratory methods as applied to soils and various bituminous mixtures. There is a 2-page glossary.

For more details circle 156 on Enclosed Return Postal Card.



SIGN

of a progressive community



The modern lines of this Tassco Tomcat street name sign represent a clean, wide-awake community. Day or night, Tassco's exclusive tear-drop shape puts the street name at the correct eye angle for clearest readability. What's more, the Tomcat's all-aluminum construction is durable, tamper-proof, easy to install, and never needs painting.

Send for Bulletin 57 for full details and specifications.



TRAFFIC & STREET SIGN COMPANY
84 Foundry Street, Newark 5, N. J.

for more details circle 322 on enclosed return postal card

OFF-THE-ROAD TIRES HANDBOOK, 52-pages, published by B. F. Goodrich Tire Co., Akron, O., describes how equipment operators and owners can get maximum service out of off-the-road tires. Four factors, all within control of the equipment operator or owner, are discussed in the handbook—load, inflation, operating conditions, and tire care. The book also describes the company's complete line of off-the-road tires, with full data and tire specifications for 1957 motor graders, self-propelled scrapers and tractor-drawn scrapers plus valve and rim information.

For more details circle 161 on Enclosed Return Postal Card.

"FOUR YEARS OF IMPROVEMENTS IN THE CATERPILLAR D8 TRACTOR", a booklet, Form No. 33178, available from the Advertising Division, Caterpillar Tractor Co., Peoria, Ill., illustrates and explains four years of product development. A large cross section view of the machine is keyed to show the major betterments.

For more details circle 162 on Enclosed Return Postal Card.

"UNDER THE INFLUENCE OF RADIO", a 16-page booklet, available from Section P, General Electric Communication Products Department, Electronics Park, Syracuse, N.Y., has been issued as a guide for prospective users of mobile radio equipment. Included is information on licenses for base stations, mobile units and for drivers. The booklet also contains instructions concerning adjustments, how to send a message, and maintenance.

For more details circle 163 on Enclosed Return Postal Card.

HIGHWAY HAZARD WARNING MANUAL: A new 8-page manual, available from Hazard Warning Lighting Division, R. E. Dietz Co., 225 Wilkinson St., Syracuse 1, N.Y., gives recommendations on portable warning lanterns, torches and electronic flashers. Manual features detailed diagrams showing recommended night-time hazard warning lighting for urban multiple-detours and rural work areas.

For more details circle 164 on Enclosed Return Postal Card.

MAINTENANCE INC., Wooster, Ohio, has announced a new edition of its 4-page condensed catalog, Form LL-2992, descriptive of "Jennite J-16", surface seal for asphalt pavements. It lists major causes of asphalt deterioration and explains how these can be stopped. Application methods and maintenance engineering services are discussed.

For more details circle 165 on Enclosed Return Postal Card.

ACKER DRILL CO., INC., Box 830, Scranton 2, Penna., has issued Bulletin 26-R, describing its hand-operated, soil sampling kit. The kit consists of 12 different soil sampling tools packed in a steel carrying case. The tools are

designed to recover accurate samples from practically any material except bedrock.

For more details circle 166 on Enclosed Return Postal Card.

BRIDGE BEARING PADS and pads for other structural uses are covered briefly in a brochure prepared for engineers and contractors by the Preformed Pad Division of Voss Belting & Specialty Co., 5645 N. Ravenswood Ave., Chicago 26, Ill.

For more details circle 167 on Enclosed Return Postal Card.

U. S. STEEL'S MOTION PICTURE CATALOG: Currently United States Steel Corp. has issued a pocket size folder descriptive of twenty-one 16mm sound films available on a loan basis for showing before recognized groups such as business and fraternal organizations, churches, schools, colleges, etc. The range of subjects includes research, steel production, construction, farm uses of steel, domestic uses and industry. Apply to R. W. Roth, Distribution Supervisor, Motion Pictures, 525 William Penn Place, Pittsburgh 30, Penna.

For more details circle 168 on Enclosed Return Postal Card.

SPREAD CHIPS FASTER, EASIER!



with New!
**"E-Z Open"
GATE**

STANDARD STEEL'S new spreader with all these features:

- Simple, low maintenance chain transmission
- "E-Z Open" gate swings away from box, carries no load
- Heavy duty, positive locking truck hitch
- Heavy double-grooved feed roll
- 0 to 2 3/4" full or tapered spread
- Available with one man control, cut-off plates, agitator, platforms

See your dealer or write for literature.

OTHER PRODUCTS OF STANDARD STEEL
ASPHALT DISTRIBUTORS . . . BURNERS . . . POWER AND TRAC-
TION DRIVEN CONSTRUCTION BROOMS . . . MAINTENANCE
DISTRIBUTORS . . . TAR KETTLES . . . AGGREGATE SPREADERS
STREET FLUSHERS . . . PIPE LINE EQUIPMENT . . . SUPPLY TANKS
SMELTING HARDWARE . . . AND AGRICULTURAL EQUIPMENT



Standard Steel Works, Inc. NORTH KANSAS CITY, MO.

65-157

... for more details circle 308 on enclosed return postal card

FILM ON WOOD AND WOOD PRESERVATION: Osmose Wood Preserving Co., 980 Ellicott St., Buffalo 9, N.Y., announces a 16-mm, 21-minute sound and color film titled "The Wonder Wood". It relates "the story of wood" and its preservation by pressure process. For loan arrangements, contact Joseph M. Bray at the above address.

For more details circle 169 on
Enclosed Return Postal Card.

TRACTOR SHOVEL: A new 8-page catalog, MS-1234, available from Construction Machinery Division, Allis-Chalmers Manufacturing Co., Milwaukee,

Wis., covers the design, engineering, construction, and operating features of 72 hp, 1½ cu. yd. capacity, HD-6 G tractor shovel specifications, and a list of interchangeable attachments are included.

For more details circle 170 on
Enclosed Return Postal Card.

HIGHWAY TRAFFIC SIGNS: A 16-page booklet, Brochure 58R, available from Tasco, 84 Foundry St., Newark 5, N.J., contains installation procedures, bid specifications, wind loadings, and general information on the new "increment" street sign of the Traffic and Street Sign Co.

For more details circle 171 on
Enclosed Return Postal Card.

CONCRETE LIGHTING STANDARDS. American Concrete Corporation, 5092 North Kimberly Ave., Chicago 30, Ill., has issued two illustrated folders descriptive of stress-spun lighting standards and their installation. The titles: "Highway Lighting" and "Urban Lighting". Brief specifications are included.

For more details circle 172 on
Enclosed Return Postal Card.

N. P. NELSON IRON WORKS, Inc., Clifton, N.J., has issued a 4-page catalog, Form 582, on its Model "200" tractor shovel. It contains action photographs

For more details circle 173 on
Enclosed Return Postal Card.

TRACK ROLLER MAKE-UP AND MAINTENANCE are discussed in "Don't Buy In The Dark", a new eight-page booklet (Form D817) released by Caterpillar Tractor Co., Advertising Division, Peoria, Ill.

For more details circle 174 on
Enclosed Return Postal Card.

STOW MFG. Co., 65 Sheer St., Binghamton, N.Y., has issued a new 20-page catalog, No. 580, covering its complete line of concrete equipment, which includes vibrators, rotary trowels, concrete grinders, ceiling grinders and vibrating screeds. Complete directions are included for building prestressed screed beams.

For more details circle 175 on
Enclosed Return Postal Card.

A GUIDE TO PARKING LAYOUT: The AC Company, RR 2, Box 64, E. Bensenville, Ill., makers of line marking equipment, automatic parking gates, and other products, has issued a 4-page folder with photographs, diagrams, and text for guidance in planning mass parking. The title "Functional Parking."

For more details circle 176 on
Enclosed Return Postal Card.

AUSTIN-WESTERN, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Aurora, Ill., has issued two new pieces of literature covering the Austin-Western hydraulic crane. AD-2407 covers working ranges and capacities, while AD-2422 covers basic specifications and all available attachments. These two pieces replace catalog AD-2253 which is now obsolete.

For more details circle 177 on
Enclosed Return Postal Card.

A NEWLY-DEVELOPED GM DIESEL ENGINE for trucks reported as 600 lb. lighter than its nearest competitor in the 210-hp range is described in a 4-page

L-20 White ASPHALT PLANT

PAYS FOR ITSELF

IN 38 DAYS!*

*\$14,700 F.O.B. Elkhart is price of portable model illustrated. Stationary model, \$13,900 F.O.B. Complete, ready to operate. Prices subject to change without notice.



Make your own hot mix asphalt with this new WHITE plant and save up to \$2.30 a ton. At its capacity of 160 tons an 8-hour day, that's a savings of \$368.00 a day. Thirty-eight of those days pays for the L-20!

Produce any type mix you can get from a \$100,000 plant: hot, RC, MC, SC and emulsified for top

course, base course, one course, or patch. Two men operate. Capacity is rated at a hot 325 degrees.

The L-20 will supply black-top for suburban streets, driveways, parking lots, school yards, or state highway maintenance.

See your nearest distributor or write direct for full information.

White Manufacturing Company, Elkhart 2, Indiana

... for more details circle 321 on enclosed return postal card

SWENSON

SPREADERS


Speed Sealcoating!

Spreads Salt or Chloride for DUST CONTROL or SOIL STABILIZATION

write for complete information

SWENSON SPREADER & MFG. CO.

Lindenwood, Illinois



... for more details circle 310 on enclosed return postal card

brochure just released by the Detroit Diesel Engine Division of General Motors Corp., Detroit 28, Mich. This new six-cylinder "71-E" engine is trimmed to 8.4 lb. per hp through the liberal use of aluminum alloys in the cylinder block and other major components.

For more details circle 178 on Enclosed Return Postal Card.

"SOLVING DRAINAGE PROBLEMS" BOOK-LET 425A: A 76-page treatise from Bethlehem Steel Co., Bethlehem, Pa., covering the design and installation of corrugated steel drainage pipe. Contains extensive descriptions and discussions, photo illustrations, plans, diagrams and charts, tables of characteristics, quantities and coefficients, average monthly rainfall at 64 key points, data on pipe manufacture and other subjects. A 20-page supplement (Booklet 477) is titled "New Tables for Evaluating Flaw Friction in Corrugated Steel Culvert Design."

For more details circle 179 on Enclosed Return Postal Card.

"BASE PAVER ATTACHMENT": A bulletin available from Sales Promotion Department, Construction Equipment Division, Blaw-Knox Co., Mattoon, Ill., describes and illustrates a new base paver attachment, the "Model P-160." The unit is designed for standard crawler-type tractors with sufficient power for its operation, and includes an exclusive oscillating screed and custom-built mounting hitch.

For more details circle 180 on Enclosed Return Postal Card.

FORK TRUCK: A 6-page brochure, available from Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich., gives complete specifications on the "CY-40," a pneumatic tire gas-powered fork truck of 4,000 lb. capacity. Descriptions of all major components are included, with charts and tables giving capacity ratings, up-right dimensions and grade and draw-ers pull ratings.

For more details circle 181 on Enclosed Return Postal Card.

BARBER-GREENE'S LARGEST CONTINUOUS-MIX ASPHALT PLANTS, in the Model 848-A series, are described in a hand-somely designed 24-page catalog now offered by the manufacturer. Although the Barber-Greene asphalt plant line comprises over 25 separate components of various capacities, only those pertinent to the 848-A are illustrated in this catalog in the various setups of that plant. Copies of Catalog 848-A may be obtained from Barber-Greene Company, 400 N. Highland Ave., Aurora, Ill., or from Barber-Greene Canada Ltd., Don Mills, Ontario, Canada.

For more details circle 182 on Enclosed Return Postal Card.

J. I. CASE Co., Racine, Wis., has issued a 12-page bulletin, CTS-111 covering its new 4-wheel drive, rear-wheel power-steer tractor shovel, the W-G Terraload'r. Complete specifications and illustrations of job applications are included.

For more details circle 183 on Enclosed Return Postal Card.

THE YALE AND TOWNE MANUFACTURING Co., Contractors Machinery Division, Batavia, N.Y., or San Leandro, Calif., has issued new specification bulletins on "Trojan" tractor shovels: Model LHM-75, 1 cu. yd. capacity; Model 104, 1½ cu. yd.; Model 154, 2 cu. yd. and Model 404, 4 cu. yd. The 2-page bulletins list standard and optional equipment for each model, and indicate how to obtain maximum production and economy in operation.

For more details circle 184 on Enclosed Return Postal Card.



Look at the uniform triple-lap coverage and straight edges you get with a "Black-Topper"

You can see the results of Etnyre's exclusive triple-lap coverage (spray from each nozzle overlapping *two* other sprays) in the unretouched photograph above. Road builders have learned that single-lap coverage is utterly unsatisfactory . . . double-lap coverage somewhat better . . . but triple-lap coverage is the complete answer to hitting rough aggregate from all possible angles for complete coverage.

Moreover, by turning the end nozzle as indicated, you get a sharp line edge which adds the finishing touch to the job. With this accurate alignment, you can spray right up to the edge of curbs. Such dependable operation and uniform, accurate distribution are typical results you can expect from an Etnyre. Investigate today — find out how soon a "Black-Topper" can be delivered to you to handle your work faster, better, more economically!

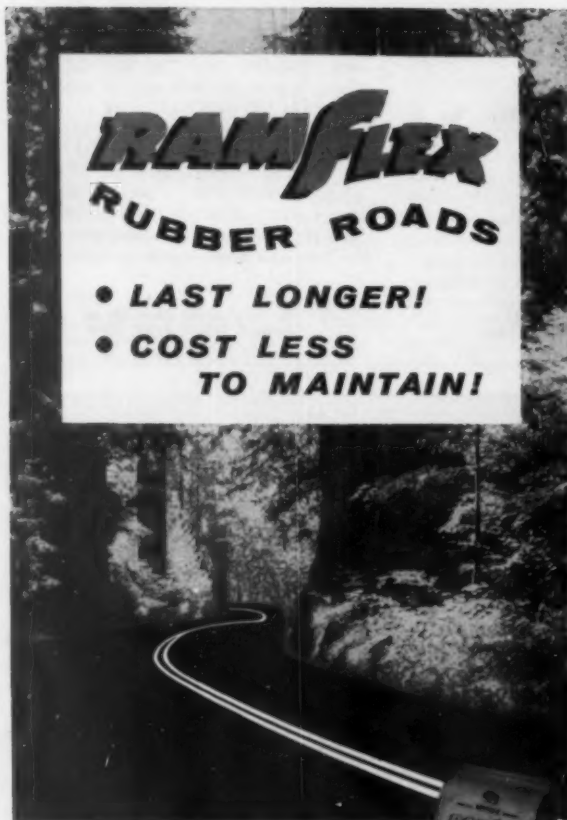
E. D. Etnyre & Co., Oregon, Illinois

SEE YOUR ETNYRE DEALER

ETNYRE
"Black-Topper"
 BITUMINOUS DISTRIBUTORS



... for more details circle 262 on enclosed return postal card



RAMFLEX
RUBBER ROADS

- **LAST LONGER!**
- **COST LESS TO MAINTAIN!**

RAMFLEX is the new Rubber Additive that mixes with REGULAR ASPHALT to create "rubberized pavement".

RAMFLEX requires no special equipment and the paving mixture spreads rapidly, evenly and uniformly. The paving won't "shove" after placed, resists cracking in cold temperatures, and "bleeding" in hot weather. Stripping and raveling of road edges is reduced to a minimum. In addition, hot patches last far longer when made with RAMFLEX. This all means lower paving costs and practically NO maintenance.

All these advantages have been PROVED on successful state, county, city and private paving installations. Why don't you be the one to introduce the revolutionary new RAMFLEX Rubber Road to your local paving program. Regular contractors do the paving... we supply the RAMFLEX in convenient size bags. Write for the money saving facts, today.

Send for this illustrated

FACT FOLDER

Every paving contractor, every government official connected with paving programs should read this informative folder.



U.S.

RUBBER RECLAIMING CO., INC.

P.O. BOX 365

BUFFALO 5, NEW YORK

... for more details circle 317 on enclosed return postal card

140



• **R. G. LeTourneau** standing beside one of his recent special models

R. G. LeTourneau Re-enters Earthmoving Equipment Field

R. G. LeTourneau Inc., pioneer developer of earthmoving machinery which sold out its earthmoving interest to LeTourneau-Westinghouse Company five years ago, ended a legal agreement period, and is re-entering the earthmoving manufacturing field.

According to Mr. LeTourneau, the time is too early to announce any definite models, but research is said to be in active progress toward new type scrapers as large or larger than any now in use.

Westinghouse Air Brake Company purchased LeTourneau's earthmoving business for approximately \$31 million five years ago, setting up the present LeTourneau-Westinghouse Company as a subsidiary. During this five year interval, when LeTourneau agreed to stay out of the earthmoving business, he has been actively engaged in the development of an electric wheel power system, each wheel embodying electric motors for direct operation.

Aluminum Bridge

Fairchild Engine and Airplane Corporation of Hagerstown, Maryland, has participated in the design and development of a new type aluminum bridge that may have wide application for highways.

This project is being conducted with the joint cooperation and assistance of the Aluminum Company of America (ALCOA), Kaiser Aluminum & Chemical Sales, Inc., and Reynolds Metals Company. Upon completion of fabrication, a 50-ft. unit will be tested and evaluated under sponsorship of the Bureau of Public Roads, U.S. Department of Commerce.

• **EMIL G. JOHN**, director of purchases and assistant secretary and treasurer of Seaman-Gunnison Corp., of Milwaukee, died at his desk on Thursday, May 22. He had been with the company since its inception in 1955, and had been associated with its president, Harry J. Seaman in previous firms since 1930.

ROADS AND STREETS, July, 1958

LITTLEFORD SPRAY MASTER

better designed—for better spraying

Design ingenuity has built into the

Littleford Spray Master an unequalled combination of engineered features that assure

faster, better and cheaper spraying . . .

For example, the Spray Master—thanks to the exclusive multi-pass flue system and the "Lite-Wate" full area circulating spray bar—heats material faster, gets the job going, saves up to an hour a day.

Nozzle design assures complete and uniform coverage up to 30-ft. widths.

SPRAY MASTER SPECIFICATIONS

Capacity: 800 to 2000 gallon sizes in stock; other sizes available for prompt delivery to meet all requirements.

Engine: Continental 37-hp, 4-cylinder, mounted at rear of tank.

Pump: 375 gpm at 375 rpm; positive metering; 4" open-

ings.

Burners: Exclusive Littleford low pressure burners with patented heat chamber.

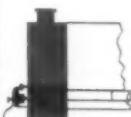
Spray Bar: "Lite-Wate," half the weight of steel bars; full circulating, mechanically operated; lengths 8-ft. to 30-ft.

That's only part of the exciting Spray Master story.

CHECK THESE ADDITIONAL ADVANTAGES:



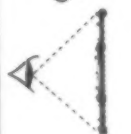
1. Single Lever Control—Not four confusing levers, but one easily operated capstan-type handwheel for fast action. Controls spraying tank circulation, transfer and draining operations—and filling, too.



2. Heat Chamber—the key to Spray Master's fast and efficient action. Heat chamber contains pump, valve and piping which are heated in the chamber by one low pressure burner—no auxiliary burners are required. Pump is far more accessible for servicing than other units because it is mounted on the rear head. Powerful pump sucks tank completely dry.



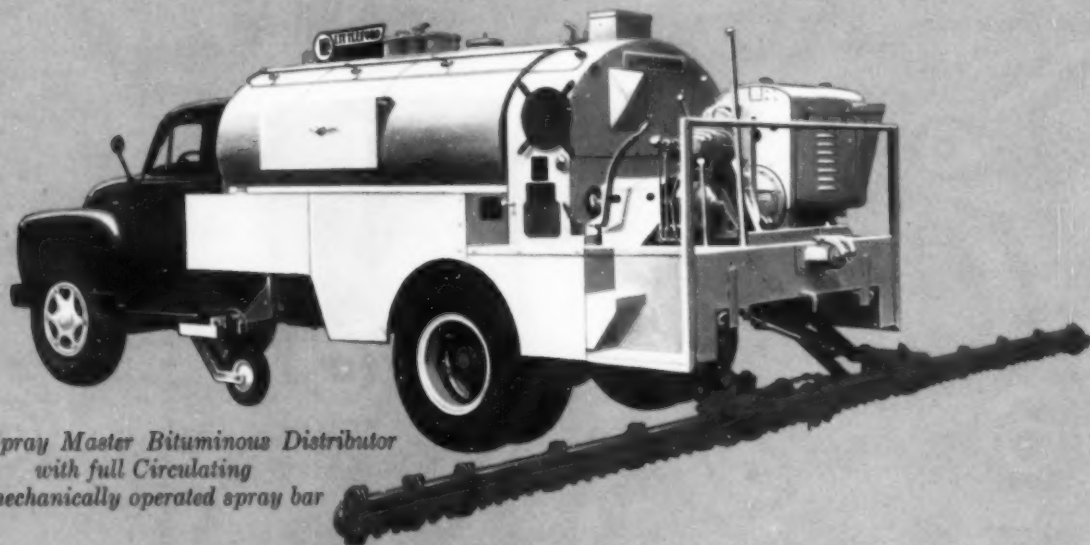
3. Multi-Pass Continuous Heat Flue—Fast, full heat from just one low-pressure burner that heats at low stack temperatures. No sludge or carbon deposits in flues.



4. Unobstructed Operator View—Operator's position puts him in easy reach of the single control. No part of spray bar is hidden by overhanging obstructions. On-the-spot adjustments can be made *before* the distributor has traveled any great distance.



5. "Lite-Wate" Full Area Spray Bar—gives full flow of hot material throughout spray bar at high pump speed. *Bar heats to spray temperature faster than any other unit, saves 5 minutes on every load.*

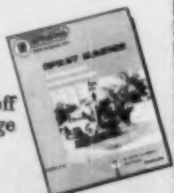


Spray Master Bituminous Distributor with full Circulating mechanically operated spray bar

Features like these are responsible for the fine performance records Littleford is setting all over the world. You want faster, better and cheaper spraying of all kinds, naturally. So check Littleford before you buy.

BETTER—FASTER CHEAPER SPRAYING

for your free bulletin tear off and mail this Airmail Postage Paid reply card today



LITTLEFORD BROS., INC., 457 EAST PEARL ST., CINCINNATI 2, OHIO

- ☐ **SPRAY MASTER**—Please send me at once—and without obligation—Littleford Spray Master bulletin 14.
- ☐ **ASPHALT PLANT**—Bulletin 37 describing the Littleford Portable Asphalt Plant shown on next page.
- ☐ **ROLLER**—Bulletin 32 describing the 3 to 5 ton Roller shown on next page.

COMPANY _____

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CITY _____ ZONE _____ STATE _____

INDIVIDUAL _____

NEW!

PORTABLE ASPHALT PLANT

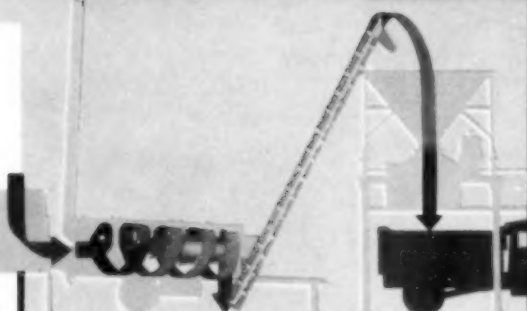
**DELIVERS 30 TONS OF "BLACK TOP"
PER HOUR AT LOWEST COST**

Now you can have bituminous concrete where and when you need it—save up to 40%—and get big plant performance at small plant cost—with the new Littleford Portable Asphalt Plant.

Now every contractor can have his own independent source of bituminous concrete. He has complete control—and can plan and carry out black top operations around the clock and around the calendar.

The new Littleford Portable Asphalt Plant is quality built . . . for continuous maximum output, for producing all types of mixes at lowest cost. Investigate this new plant today . . . discover the money-making possibilities you can realize!

*Make Money with your own asphalt plant.
Complete facts contained in bulletin 37.
Request your copy today.*



1. 5-ton dual feeder bin proportions and feeds aggregate directly into dryer.
2. 30-ton rotating dryer made of heat resistant Cor-Ten steel. Economical counterflow burner system. Even-veil lifting flights give most efficient drying action available.
3. 30-ton hot elevator delivers continuous cascade of aggregate.
4. 5-ton storage hopper holds and discharges aggregate as required.
5. 1000-lbs. batching hopper.
6. 1100-lb. twin-shaft pugmill with precision type steel wear plates, chrome molybdenum steel tipped paddles. Thoroughly mixes and dumps half-ton batch every 60 seconds.
7. Self-elevating platform permits discharging of bituminous concrete directly into trucks.

LITTLEFORD 3-5 TON PORTABLE ROLLER

with feather-touch power steering



Full time power steering brings fingertip steering to this 5-ton giant . . . which also offers these additional outstanding construction and operation advantages:

1. Hydraulic powered trailing conversion which permits operator to engage towing truck pintle hook from a

sitting position.

2. Removable trailing wheels permitting rolling of asphalt close to buildings and other obstructions.

3. Hydraulic raising-lowering system located entirely within roller housing—another Littleford exclusive! No rams protruding on either side.

4. Choice of air or water cooled engine.

5. Electric brakes for trailing wheels available.

The 3 to 5 ton model complements the Littleford line of portable tandem rollers which also includes a 2-3 ton model and a 4-6 ton model. Write today for descriptive bulletins.



FAST FACTS contained in Roller bulletin 32. Use Airmail reply card to request your free copy.

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With Closed or Open Cabs

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BRAND NEW — 1958
Complete with Cle-tracts
\$3600 each

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For Sale International T-D 24
7 roller Track Frame
Complete with Front & Rear Winch
Like new \$7,500.

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SHOVELS, CRANES & HOES

Bantam "M-49" Used $\frac{3}{8}$ yd. Trench Hoe,
mounted on International 6x6.

Insley "K-12" Reconditioned $\frac{1}{2}$ yd. Crane,
Dragline or Hoe.

Insley "K" $\frac{1}{2}$ yd. Hoe or Dragline, mounted
on Crane Carrier, 1957 model.

P&H "C105" $\frac{1}{2}$ yd. Hoe or Crane, mounted
on Crane Carrier.

P&H "55" $\frac{3}{8}$ yd. "Mitey-Mite" Hoe,
mounted Zeligson Crane Carrier.

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Caterpillar "D-6" Used Tractor, S/N 9U-
5482 (1950 model), w/Trackson Cable-
controlled Hi-Lift Front End Loader.
Excellent shape.

Caterpillar "D-4" Used Tractor, S/N 7U-
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Loader. Excellent condition.

I-H "TD-9" Used Diesel Tractor w/Hough
Hydraulic Front End Loader.

Terra Trac "500" Excellent used Tractor
w/hydraulic loader & hydraulic scarifier.
1200 hours.

Allis-Chalmers "TLW" Used R.T. Tractor
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Rex 3 Yd. Hi-Discharge ($\frac{1}{4}$ yd. Agitator)
1950 model, mounted Chevrolet 6400
Tandem axle truck.

Rex 3 Yd. Hi-Discharge ($\frac{1}{4}$ yd. Agitator)
mounted on 1950 Model LF172 Tandem
Axle Truck.

Jaeger 3 Yd. Hi-Discharge ($\frac{1}{4}$ yd. Agi-
tator) repaired, blasted & painted.
Mounted Chevrolet tandem truck.

Smith 3 Yd. Hi-Discharge ($\frac{1}{4}$ yd. Agi-
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1—Blaw Knox Road Paving Plant w/3
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cement storage; dual automatic inter-
locked batchers

3—Blaw Knox Ready Mix Concrete Plants
with & without mixers

1—Noble CA354 Automatic Batch Plant

2—Blaw Knox 300 & 800 bbl. cement
plants

2—Blaw Knox 3 & 4 comp. agg. bins

1—Standard 5000 lb. asphalt plant, like
new

2—Cedar Rapids E4000 lb. asphalt plants

3—Barber Greene 845 & 848 asphalt plants

2—Madsen 4000 lb. asphalt plants

1—Simplicity 10' x 20' Dryer assembly

4—Barber Greene 879A asphalt finishers

3—Blaw Knox PF90 asphalt finishers

2—Blaw Knox & Apsco 85 & P125 base
pavers & widening machines

9—Tandem & 3 wheel rollers—all sizes

5—Blaw Knox & Jaeger 10-15' & 20-25'
concrete spreaders

6—Blaw Knox & Jaeger 10-15' & 20-25'
concrete finishers

4—Koehring 10-15' & 20-25' longitudinal
finishers

3—Joint & spray machines for 25'

4—Buckeye & Blaw Knox 10-15' & 20-25'
subgraders

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10,600' Blaw Knox & Heltzel 9" x 9"

9,000' Blaw Knox 10" x 10"

4,000' Superform 12" x 12"

1,800' Heltzel 10" x 14" reversible

4,000' Blaw Knox 11" x 13" Reversible

5,000' Superform 12" x 16" reversible

10,000' Heltzel 14" x 15" reversible

2,000' Heltzel 15" x 15"

4,630' Heltzel 17" x 17"

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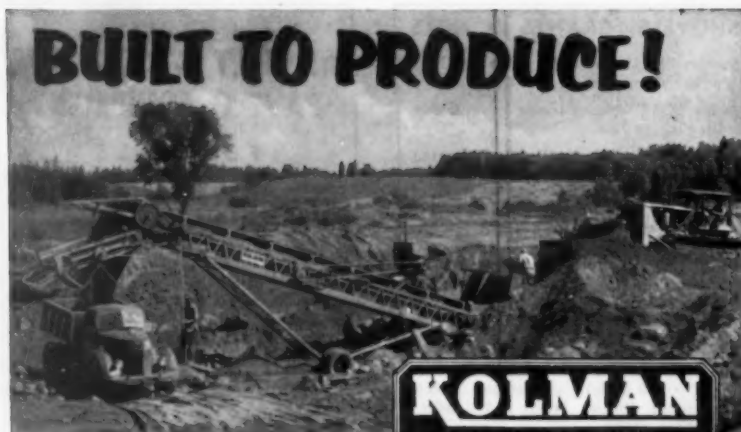
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KOLMAN 36" Model 101 Can Load and Screen Over 800 TPH

Kolman's rugged construction in the Model 101 Portable Conveyor-Screen plant makes it a brute for production. The 36" x 50-foot unit shown is capable of loading over 800 tons per hour. Owned by Lindquist-Olson & Co., Cambridge, Minn., it is one of many such plants in use throughout the country in highway construction.

Included in the plant is the SB-80 Kolman single-deck Vibrating Screen — over 30 square feet of vigorous screening power. It is capable of carrying either a single, double or triple-deck vibrating screen without additional support.



The Kolman Model 101 is available in belt widths from 18" to 42" and in lengths up to 60 feet on portable plants. It can be equipped with a dozer trap, casting hopper, feeder-trap, or feeder-hopper. The complete plant is portable with no disassembly whatever. Adaptable to any type of feeding—dozer, dragline, shovel, front-end loader and others.

Best of all, you'll find the price attractive!

Write for Literature and Prices

KOLMAN MANUFACTURING CO.

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Sioux Falls, S. D.

COMPLETE ASPHALT SPREAD

Cummer 120-ton per hour hot mix asphalt plant, new 1954, has produced less than 150,000 tons, condition excellent, consisting of the following: 3 compartment 40 ton capacity feeder bin, 75" x 28' Cummer internal dryer, cold material elevator, one low pressure gas, one steel encased hot material elevator, 60" x 12' Cummer link belt vibrating screen (double deck), 70 ton capacity 4 compartment storage bin, 5000# capacity steam operated mixer, 6000# capacity weighbox, 6,000# capacity dial scale, steam jacketed bottom discharge asphalt bucket, 600# capacity, 600# capacity dial scale, lime dust elevator, dust collection system, complete, one Cummer GE Timer, complete panel board system; additional equipment, 3/4 yd. N. W. Model 25 Diesel Crane, D6 Cat Cable dozer, Galion 3 wheel roller 24" rear wheels, Galion Tandem Roller, Huber 3 wheel Roller (24" rear wheels), Barber Greene Asphalt Finisher, Elgin Sweeper, Gradall, new 1950, Littleford 800 gal. Distributor. Location: Cleveland, Ohio. Available 30 days. Prices on request.

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- 3 1956 Ford F-600's, LWB chassis and cabs.
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NEW — U.S. ARMY SURPLUS

SAVE 25%

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Largest Horsepower Output for Its Size!

Engine Model GM6-71, 12 Cylinder, 4 1/4" Bore x 5" Stroke.
851.5 Cubic Inch Displacement.

The Rated Brake HP Performance of the Twin GM6-71 Engine is: 180 HP at 800 RPM and up to 400 HP at 2000 RPM.

Overall Dimensions 6' x 6' x 5' - Weight 5000 lbs.

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1 - Adun Paver in excellent mechanical
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Normal spread 8' to 10'. Can adjust from
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"Cat" D337 Y Diesel Power Unit,
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125	G.M.	6-71	1800	120-208/480	1
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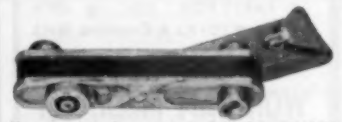
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LINKBELT SPEEDER TRUCKCRANE
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Flex Model 34-E, single drum, powered by GM 3-71 engine, auxiliary water pump, hydrocycle control, standard water storage tank and standard horizontal boom.
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This machine purchased new late in 1957. 494 hours to date. Equipped with Dry Air Cleaner, Crank Guard, Front Pull Hook, 9A Dozer (less blade and braces, plus push cup), #50 Hydraulic Control and #9 Ripper. This machine is priced to sell and may be seen at 2201 East Cheyenne Road, Colorado Springs, Colorado.

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Concrete Finisher, Jaeger Type "H", double screed, Continental Gas Engine, new 1956, used only three months. Like-new condition. \$5,000.00
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Koehring Form Subgrader, A-1 condition. \$350.00
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Completely overhauled 1958, excellent condition, tires 9:00 x 20.
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Purchased New 1952; Never used.
1—Blaw-Knox Concrete Spreader (25 ft.).
Rebuilt in 1952.
1—Helfzel Dummy Joint Transverse and Longi-
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1951; Used 6 months only.
1—Koehring Longitudinal Finisher with Auto-
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Northwest 6's, 80-D's, and 95 cranes—drags
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booms, ind. BH's
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Northwest Draglines, 1/2 yd. to 2 1/2 yd.
Northwest Shovels, 1/2 yd. to 2 1/2 yd.
Manitowoc Draglines, 2 1/2 yd. to 5 yd.
Manitowoc Shovels, 2 1/2 yd. to 5 yd.
Marion Shovels & Drags, 4 yd. to 8 yd.
Lima Shovels & Drags, 1 1/2 yd. to 6 yd.
Osgood Shovels & Drags, 1 1/2 yd. to
2 1/2 yd.
Caterpillar Graders & Dozers.
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P&H Truck Crane.
2400 Lima Shovel front attachment.
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1—1955 Geardrill jeep trencher. Machine
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1—105 LeRoi Tractor. A self powered com-
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Dragline, 80 ft. Boom, D13000 Eng.
This machine is in very good con-
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This Equipment is in A-1 condition — For more information or detail,
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mission 4,800.00
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Also includes two 4000 gallon Asphalt
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tank car heater on truck, 2" Asphalt
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Shovels - Backhoe - Clam Drag - all sizes.

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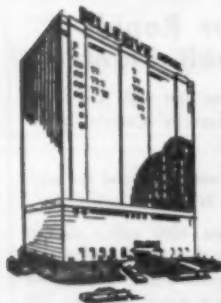
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- 1 —6T 36" Ga Plymouth Diesel Locomotive
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HI-PRESSURE Centrifugal Pump, 4", 2-stage, direct connected to Continental 6 cy. engine, 500 ft. hd. & 600 gpm. New. Cost \$5780. Sell \$2000 Yard.

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Requiring two heavy-duty Fruehauf carryalls, this 130-ton jet engine test cell is the heaviest load ever moved on trailers in the Indianapolis vicinity. The job was handled by Cardinal Machinery Movers, Inc., heavy rigging and erection specialists.

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Are you still active in the field? Have you moved or changed your position? Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

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156

ASPHALTIC CONCRETE

(Continued from page 128)

longed rolling of steadily cooling pavements will more than iron out a few of the inequalities built into a pavement that has received its knock-down rolling over a wide temperature range. Picture if you can the convergence of all of the points plotted for each of the curves to form a single point for each set. Perhaps by prolonged rolling we might be able to converge a few points plotted for the lower temperature range, but for the points plotted for the higher temperature range we can do nothing except to aggravate conditions.

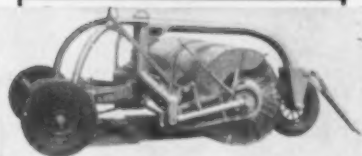
● A little extra effort in the field to rigidly control the temperature for knock-down rolling will save money spent for extra hours of rolling that can only partially correct a situation for which there was no need in the first place. The accompanying graphs were plotted from data obtained after compaction of specimens taken from a hot-mix intended for airfield pavement. The vertical lines on each of the graphs show that at 250°F the curves intersect ordinates within the criteria range for the type of mix being placed.

The exact compaction temperatures for the various types of mixes will, of course, vary depending on the criteria selected for the mix being worked. Nevertheless, the 250°F temperature remains as a good control point to aim for on our knock-down rolling of asphaltic concrete pavements. An effort expended in this direction will not only save dollars spent needlessly for prolonged rolling, but will produce more uniformity of our pavements, reduce differential shrinking, and produce longer life pavements.

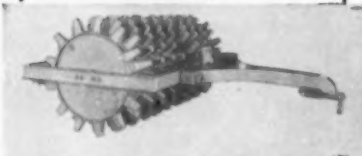
The statement and opinions as expressed herein are the author's own and do not necessarily reflect the methods used by the Corps of Engineers.

● The Board of Directors of Littleford Bros., Inc., Cincinnati, Ohio, manufacturers of black top road maintenance and construction equipment has announced the election of the following officers: R. S. Littleford, Chairman, Board of Directors; J. S. Wadsworth, President; J. B. Meyer, Vice-President and Treasurer; J. H. Albers, Secretary and Assistant Treasurer.

Grace ASPHALT AND COMPACTION EQUIPMENT



Roadsweepers,



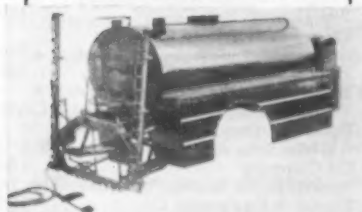
Sheepfoot rollers



Chip spreaders



Circulating asphalt heaters



Asphalt Distributors



Pneumatic rollers, self-propelled or trailed

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Dallas, Texas

With the Manufacturers and Distributors

THE CHILDERS MANUFACTURING COMPANY of Albuquerque, New Mexico, producers of circulating hot oil heaters, has announced the appointment of two distributors on the West Coast. The Santa Fe Equipment Co., 3000 Santa Fe Ave., Los Angeles 58, will serve all of Southern California and Southwestern Nevada. The West Coast Engine and Equipment Co., 1081 Eastshore Highway, Berkeley, is the new distributor for Northern California and Northwestern Nevada.

Universal Engineering Corporation has moved its engineering offices to the Dial Building, formerly the Chandler Building, 150 Tremont St., Boston, Mass.

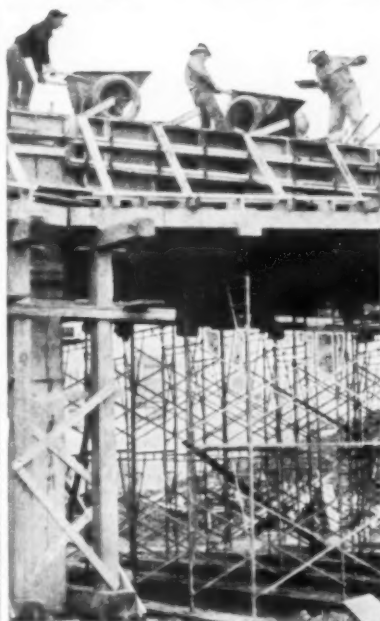
Armco Drainage & Metal Products, Inc., Middletown, Ohio, has announced a new financing plan for purchasers of its broad line of prefabricated steel buildings. The plan not only provides for delayed payment but makes available as much as 200% of the cost of the basic building when it is to be used for industrial or commercial purposes and 150% for agricultural purposes.

HALL-SCOTT INC. AND HERCULES MOTORS CORP. have jointly announced the purchase by Hercules of the Hall-Scott Engine Division of Berkeley, Calif. Hercules plans to build Hall-Scott engines in their present plant at Canton, Ohio as soon as it is possible to move the necessary machinery and inventory from Berkeley. Hall-Scott service parts will continue to be available and will be handled through Hercules and Hall-Scott distributors and branches. The transaction will complement Hercules' present line of liquid and air-cooled gasoline and diesel engines and will make available a range of from 5 hp to 600 hp.

THE UNIVERSAL FORM CLAMP CO. of Chicago, Illinois, manufacturer of form ties and accessories for concrete forming, has elected E. L. Mayers as chairman of the board and president of the firm, and J. I. McClelland as general manager and executive vice president.

IRA E. JOHNSON, manager of the Chrysler Corporation Chelsea Proving Ground, and W. B. Love, chief truck chassis engineer for Studebaker-Packard Corporation, have been elected chairman and vice-chairman of the Automobile Manufacturers Association's special road test committee. In addition, the committee re-elected L. C. Lundstrom, director of the General Motors Milford Proving Ground, as AMA's representative on the Highway Research Board national road test advisory committee.

Bridge Forming

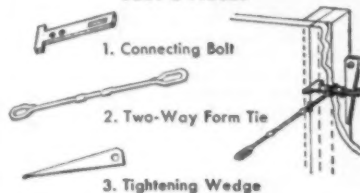


Symons Forms Cut 100 Days Off Bridge Forming Job Ease of Erecting and Stripping Reduces Pouring Time

Contractor Lee Hoffman, Beaverton, Oregon, was given 320 days to pour 4,000 cubic yards of concrete for a bridge over Myrtle Creek in Oregon. Job was complete in 220 days or only $\frac{3}{4}$ the time allotted.

Harry Pajutte, Chief Engineer for Hoffman, credits the ease of erecting and stripping Symons Standard High Strength Forms with contributing substantially to cutting pouring time, reducing number of men required on job, and providing greater mobility for the pouring equipment. Only

JUST 3 PIECES



3,144 square feet of panels were required for the 160,000 square feet of forming.

Symons Forms, Shores and Column Clamps can be rented with purchase option. Facts on Symons products and engineering service available upon request.

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Chicago 39, Illinois

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ROADS AND STREETS, July, 1958

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PHOTOGRAPHS

- Applying a medium-curing Texaco Cutback Asphalt to windrow of soil.
- Pulvi-mixer and motor grader blend Cutback Asphalt and soil.
- Compacting Texaco-treated soil with multi-wheel and tandem rollers.
- Completed soil stabilization project in Wadena County, Minn.

Wadena County, Minn., is building this road by stages, thus spreading the cost over a period of years. Pictured here is the first stage. The cohesionless soil on the road is being stabilized by a thorough blending with a Texaco Medium-curing Cutback Asphalt. This transforms the formerly dusty, muddy road into a durable, water-proof, all-weather surface.

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